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The Canadian
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Vol. X. TORONTO, NOVEMBER, 1920 No. 11

GOITRE

By F. N. G. Starr, C.B.E., M.B., F.A.C.S.,
R. R. Graham, M.B., and
W. L. Robinson, M.B.

Toronto

THE thyroid, arising from a median and two lateral rudiments of the fifth branchial arch, is composed finally of a fused organ, the isthmus of which crosses in front of the trachea. Although embryonically it has a duct, the processus pyramidalis connecting with the foramen cæcum at the base of the tongue, this is early obliterated by development of the hyoid bone. The thyroid gland is therefore ductless. It is composed of follicles lined with epithelial cells, which are usually cubical in the normal gland. The follicles are generally round and separated from each other. The epithelial cells secrete a hyaline material known as colloid, which distends the follicles to some extent, and is characterized by the presence of iodine in intimate combination with a protein.

A number of anatomic and physiologic factors have an important bearing on the pathology of this gland. Its great vascularity lends itself to wide variations owing to the great capacity of the venous sinuses, which may be over-developed and give rise to a pulsating tumour with a hæmic murmur. The blood current which encircles the alveoli is separated from the epithelium only by a single endothelial layer. A basement membrane is absent, the mobility of the epithelium being thereby increased. The colloid

First paper contributed to a symposium on goitre at the fifty-first annual meeting of The Association, Vancouver, June 23rd, 1920.

secretion of the organ varies rapidly in quantity and in composition and exerts a marked influence on the structure of the diseased organ. Another important factor is found in its remarkable response to functional stimuli. Marked cellular hyperplasia may readily be induced by changes in diet, and administration of drugs may bring about a reduction. No other gland, and only the lymphoid tissues, exhibit such adaptations. (Ewing.)

When approaching any subject it is very essential that one shall know something about which he essays to speak, and then he must have some means of conveying his thoughts to others, in order that they may be intelligible. Therefore it seemed to us that the best way of attaining this purpose is, first of all, to tell you what we are talking about, and then endeavour to talk at least a moderate amount of sense.

It is always a risky business to suggest a classification that may vary, even if only in verbiage, from a recognized standard, but having made a careful clinical and pathological study of about three hundred cases in our clinic during the past few years, we are prepared to take the plunge, for it gives us a clearer understanding of what we are talking about, when we divide our cases into the following:

1. Diffuse....
   - (a) Colloid.
   - (b) Hyperplasia.

2. Tumours..
   - (a) Adenoma..
     - (1) simple.
     - (2) colloid.
     - (3) hyperplastic.
   - (b) Malignant.
     - (1) carcinoma.
     - (2) sarcoma.

The diffuse colloid goitre (Fig. 1) is characterized by a marked enlargement of the gland. On gross section the gland presents cystic spaces filled with colloid, to which the enlargement is due, and shows a translucent brownish honeycomb appearance. Cysts of all sizes may form by fusion of the adjoining spaces, by liquefaction, or by hæmorrhage. The gross appearance, however, may vary greatly, owing to hæmorrhage, pigmentation, or calcification. Even bone deposits are often obscured in the late stages.

Microscopically it is made up of alveoli, more or less normal, distended with colloid. The lining epithelial cells are flattened. In places the walls of the adjoining alveoli have melted away to

form enlarged spaces at this point. The colloid is of normal appearance. Fatty and hyaline degeneration with calcification and fibrosis regularly mark the advanced stages.

In the first group we also place the diffuse hyperplastic, more commonly known as exophthalmic, goitre (Fig. 2). The gross appearance from a typical case shows a moderate enlargement of the gland, richly supplied with blood. When the gland is removed and loses some of the blood, it appears pale, dense, and rather firm. On gross section its cut surface is both finely and coarsely lobulated, opaque, and of a pale grayish pink colour. Little or no colloid can be seen.

Microscopically (Fig. 2) the alveoli are no longer uniform in size and shape, but irregular in outline, due to the epithelium lining the alveoli being thrown into folds, appearing often as papillary ingrowths encroaching greatly upon the cavity of the alveolus. The epithelium, instead of being flattened as in the colloid form, is columnar. There is little or no colloid, what colloid there is, being granular or shreddy like a thin coagulated fluid. Definite lymphoid nodules are often found scattered through the gland, an appearance which, while fairly characteristic of this disease, is rarely if ever seen in the normal thyroid.

Of the adenomata we have come to recognize three types. The first we designate as simple adenoma (Fig. 3) for, although it resembles very much in microscopic section the fœtal thyroid, yet it has never been found in such; as it develops about the time of puberty.

The simple adenomata in their fresh state are elastic, and on section show a smooth velvety surface, grayish white in colour, or flecked with small diffuse hæmorrhages. Owing to their poor blood supply these tumours very often undergo softening in the centre to form cysts filled with turbid blood-stained fluid, which in time may become clear yellow, and contain cholesterin.

Microscopically it is seen to be made up of small round alveoli lined with high cubical epithelium, enclosing small lacunæ and containing very little if any colloid. The tumour is surrounded by a definite fibrous tissue capsule and usually shows a marked compression of the surrounding gland tissue.

The second or colloid type of adenoma (Fig. 4) has all the characteristics of the diffuse colloid goitre, except that it is a small encapsulated nodule. In the gross one or more encapsulated nodules may be seen, which on section have a translucent brownish

honeycomb appearance, showing small cysts of varying size due to fusion of adjoining spaces.

Microscopically it is seen to be made up of normal looking alveoli distended with colloid. The lining cells are flattened. In the advanced stages these tumours may show fatty and hyaline degeneration with calcification and fibrosis. These, because of their similarity to the diffuse colloid goitre, we have designated as colloid adenoma.

Our third group of adenoma we call the hyperplastic adenoma, often spoken of as the toxic adenoma (Fig. 5). Its cut surface shows a smooth velvety surface, pinkish gray in colour, having a definite capsule and standing out in contrast to the rest of the gland substance.

Microscopically it shows the same hyperplasia as seen in the diffuse form. The epithelium lining the alveoli is columnar in type and thrown up in folds. There is very little, if any, colloid.

This second and third subdivision probably arise from embryonal rest cells similar to the first type, but they take on the characteristics of the two types in the first main group.

These adenomata are all recognized in the gross as one or more circumscribed nodules with a definite capsule made up of a tissue different in appearance from the surrounding gland, which becomes greatly compressed by the sharply outlined nodules.

Of the malignant tumours there are the carcinoma and the sarcoma. The more important is the carcinoma, which may resemble the thyroid tissue so perfectly as to be distinguished from it with difficulty, and yet give rise to multiple metastases of similar normal appearance in various parts of the body, especially in the bones. It may grow in solid masses, or in papillary form within cysts, so that its tumour characteristics are readily recognized.

Sarcomata are rare and arise from the stroma cells. They may contain a large number of tumour giant cells.

The Cleveland experiment has shown that the goitre of puberty and of adolescence may be greatly mitigated if not cured in the large majority of cases. It is conceivable that if in goitre districts, children are given occasional courses of treatment of sodium iodide, goitre may be entirely eliminated. It is up to the medical profession to work this problem out and not to wait until the disease is well established before beginning a line of treatment.

Essentially the sheet anchor of hope for a cure in all types of goitre is surgery. A few cases, however, of hyperplastic or exophthalmic goitre, as well as its adenomatous prototype, the hyper-

plastic adenoma, are greatly benefitted by rest, physical and physiological, and hygienic surroundings, assisted by the Coolidge *x*-ray or radium. Medicine, *per se*, is of no benefit whatever, merely permitting organic changes to take place in the heart, liver and kidneys while it is given a time consuming trial.

Each case must be given individual study, and an endeavour should be made to discover, from the clinical findings, the type to which it belongs.

The diffuse hyperplastic and the hyperplastic adenoma are frequently mistaken one for the other. Each may show hyperthyroidism, with a rapid pulse, weakness, loss of weight, malaise, highly neurotic temperament, cardio-vascular instability, exaggerated reflexes, tremor, loss of appetite, diarrhœa, depression; *but in our series the hyperplastic adenoma has never shown exophthalmos.*

In these cases one frequently finds a history of prolonged and strenuous nervous strain, though occasionally it may be but a sudden nervous shock; often there is a history of the symptoms developing during or immediately following a severe infection, or following a series of repeated milder infections, such as tonsilitis or some mouth infection. Here the physician may be of inestimable value in getting such conditions cleared up early, and placing the patient at rest. By such care we have seen a number of these cases benefitted and the cure apparently completed by several series of Coolidge treatments.

Then there is the well established case that has gone on for six months, a year, or more, and has had one or more crises. The first very bad crisis usually occurs during the second six months, according to the statistics of the Mayo Clinic, and following this crisis, or later crises, the heart, liver and kidney damage has to be reckoned with. In this type of case, if the basal metabolism is above 135 per cent., we do not proceed with radical operation, but lead up to it gradually by rest, Coolidge, and later by ligation. Then when the basal metabolism gets below 135 per cent. we proceed to radical operation.

It is most important to have a clear cut understanding of these cases before one can deal with them properly. One must not mistake a pericarditis associated with an enlarged thyroid for hyperthyroidism. Nor must one confuse an early paralysis agitans associated with a hyperplastic thyroid for the tremor of hyperthyroidism, and make promises for the future improvement in the tremor that can never be realized.

The cases presenting diffuse colloid, the simple adenoma, and

the colloid adenoma, usually come complaining of an unsightly lump. If the history is gone into, it usually is found that there is some dyspnœa, perhaps relieved at first by an extra pillow for sleeping; sometimes they complain of an altered tone in the voice, or of occasional periods of complete loss of voice. The diffuse colloid and the colloid adenoma case frequently complains in addition that she tires easily and has no "pep". If these enlargements extend behind the sternum, they often give rise to very marked dyspnœa. The simple adenoma may even become very large if situated above the sternum and yet cause no symptoms. Is it not far better to remove it while the case is a safe surgical risk, than to wait until it has become very large with an active blood supply coming to its capsule, or until a hæmorrhage occurs into the cyst as in one of our recent cases, rapidly converting a simple case into a hazardous surgical undertaking?

There is too, a danger, though remote, that malignant change may be engrafted; hence for these reasons we recommend surgical interference.

In the malignant tumours there usually is a history of some enlargement of the thyroid gland, extending over a longer or shorter period, causing few if any symptoms, then a slight dyspnœa which becomes rapidly progressive. If one is fortunate enough to get these cases before the growth has broken through its capsule, and carefully removes it with its capsule, there is probably no other location where cancer occurs that gives so hopeful a prognosis. If on the other hand the capsule is invaded, we know of no other more horrible and distressing termination.

In preparing this paper we have purposely avoided too much distressing detail regarding the diagnosis of the various types of goitre, but have attempted rather to outline methods of procedure according to the type of goitre to be dealt with, that will give the best results to our patients.

When one has gone carefully into the clinical history, has studied the patient's present condition, and has exhausted all the mechanical methods at his disposal, he must correlate all this collected data, and then bring into play that best of aids, namely; the keen clinical sense that comes from experience based upon careful observation.

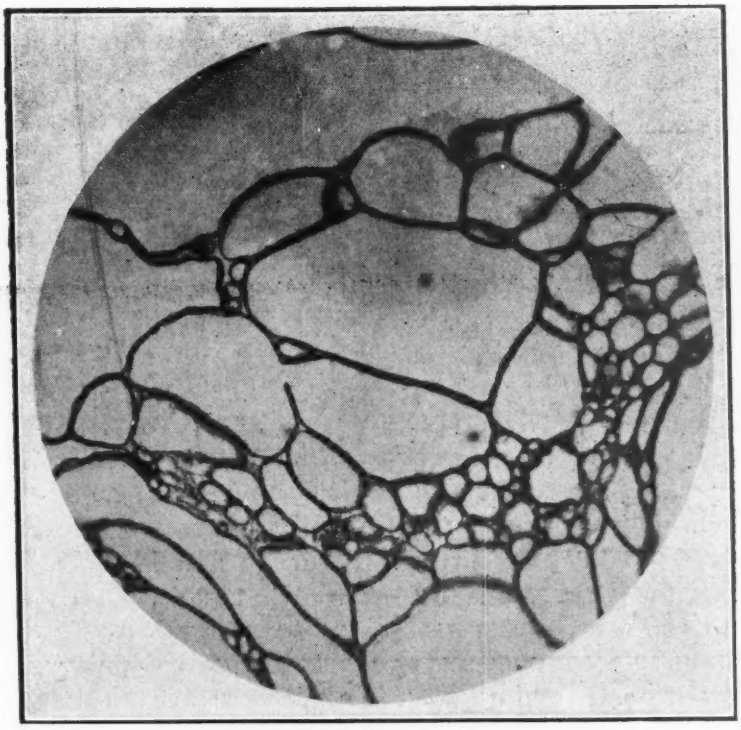

FIG. 1.—Diffuse Colloid Goitre.

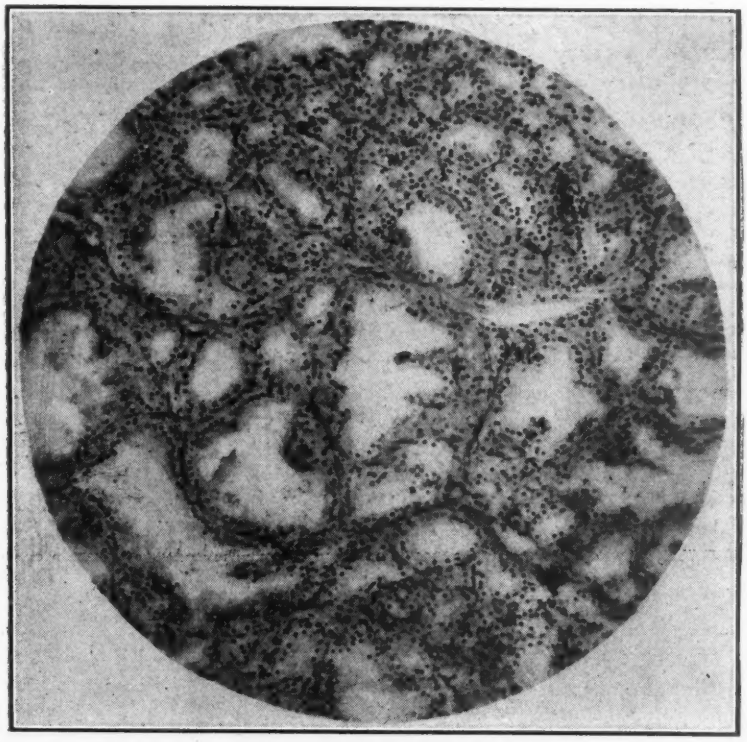

FIG. 2.—Diffuse Hyperplastic Goitre

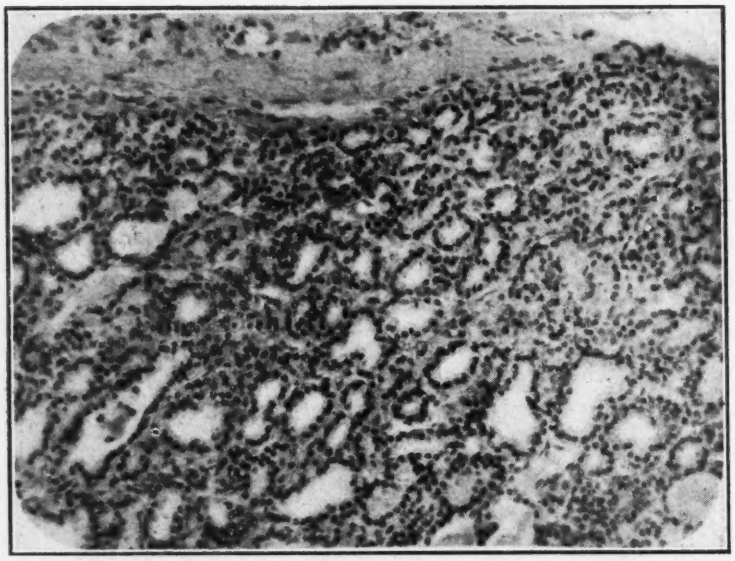

FIG. 3.—Simple Adenoma of the Thyroid.

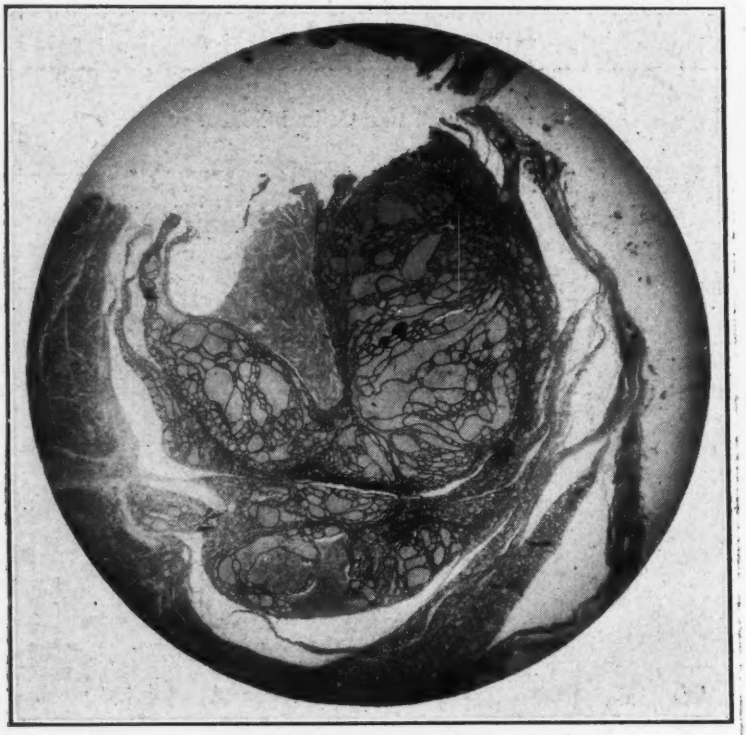

FIG. 4.—(Low Power). Colloid Adenoma.

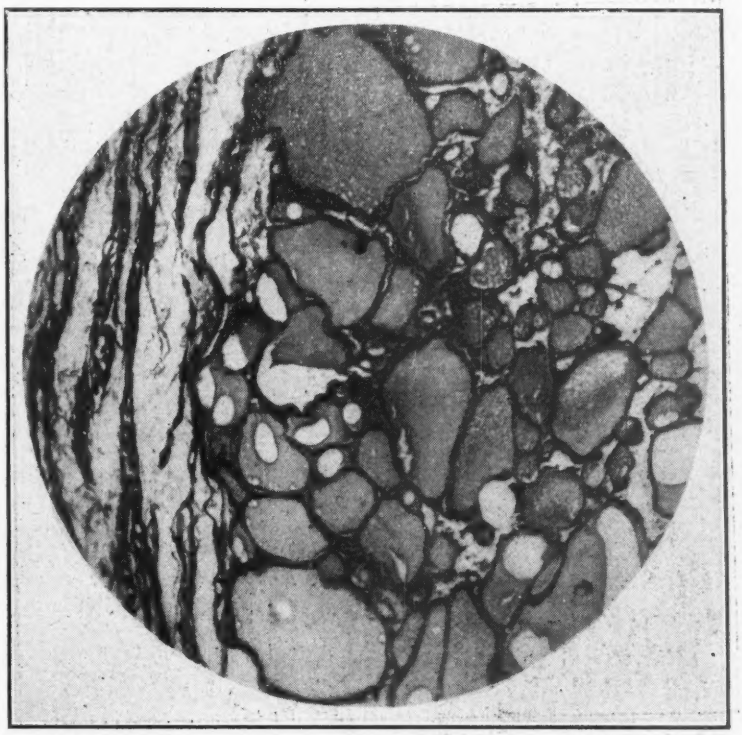

FIG. 4.—(High Power). Colloid Adenoma.

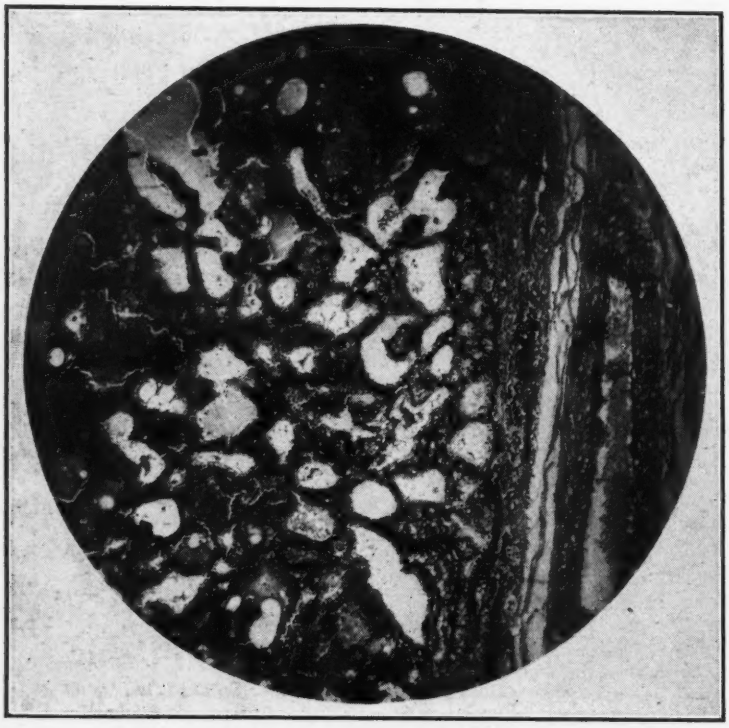

FIG. 5.—Hyperplastic Adenoma of the Thyroid.

GOITRE AND ITS MEDICAL TREATMENT

By J. M. Pearson, M.D.

Vancouver

THAT part of the symposium on goitre which has been allotted to me is the medical treatment. There being no specifications as to the form of goitre, I have chosen those varieties which produce symptoms known as hyperthyroidism. These will include hyperplastic goitre producing exophthalmos, and that form of goitre in which toxic symptoms arise without any protrusion of the eyeballs.

Therefore, for the purposes of this paper, I shall employ the terms "toxic goitre", or "thyro-toxæmia", or "hyperthyroidism" to indicate the group of symptoms (or the disease causing it), only too familiar to us all, of tachycardia, tremor, loss of weight, vasomotor disturbances, and so on, with or without exophthalmos.

In beginning the few remarks I have to make, I can perhaps clear the ground a little by stating at once that there is *no* medical treatment for toxic goitre in the sense that we are able to procure a permanent or even a temporary cessation of its effects. It is true that we are able to place a patient in a position in which he or she can best resist the ravages of the disease or to modify some of its more obvious symptoms, or to make good some of its depleting effects. But we possess in our therapeutic armoury no weapon which can act as an antidote to the poison produced by or through the thyroid gland, nor have we any clue to the causative factors of the disease which would enable us to step in and prevent its development.

The surgeon is in little better plight. Strictly speaking, he, in the last event, does not *cure* the patient. To take away an offending portion of the body can in no sense of the word be considered the equivalent of restoring its integrity or causing the peccant portion to resume its orderly function. We may assume also that the use of the *x*-ray is really bloodless surgery, aiming, like operative measures, at the destruction of so much of the secreting

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Second paper contributed to a symposium of goitre, at the fifty-first annual meeting of The Association, Vancouver, June 23rd, 1920.

or absorbing area of the gland as may reduce the output of noxious material to the point at which the system is able to take care of it. And the efficacy of its destructive power is the measure of its success. The truth being, I take it, that until our knowledge of the ætiology of the disease is greatly increased, and a cure based thereon, all forms of treatment will probably be more or less inadequate.

By the physician, hyperthyroidism may be regarded as a self-limiting disease, subject, like so much in the natural history of illness, to periodical exacerbations and remissions. If he can fortify the system so that the patient may outlive the exacerbation, he may be rewarded by a recovery which almost amounts to a cure. If the struggle has been taken early in hand or has not been unduly prolonged or severe, his patient may be called a well man. In the reverse, the patient, if he lives, may bear some permanent mark of the controversy.

There is this drawback, however, that at some future time the gland may again take on its aberrant function and one of the benefits the surgeon or roentgenologist is able to offer is that he has removed or destroyed the greater part of the gland or its secreting or absorbing surfaces and that by so doing has rendered the liability of recurrence less. This is true, but it does not comprise the whole truth, for we know by experience that, at times, little thyroid enlargement is associated with a great amount of toxic symptoms, therefore, whatever little is left may be presumed to be still capable of producing a conflagration. There is, however, always the possibility of a second operation in reserve.

What, then, are the means the physician may employ, other than the *x*-ray, which, being in one sense a non-surgical method, ought legitimately to come under his control.

They are two—rest and feeding. To these, I would add a third, psychotherapy, and even a fourth. And upon further consideration, I am inclined to think that the fourth ought really to have been put first. It is a remedy, the virtues of which are emphasized by the great clinicians of old, frequently overlooked by us all and never more in need of iteration and reiteration than in this age of laboratory methods and the scientific study of disease. I speak of the injunction to "treat the patient and not the disease". The profession, no less than the public, dearly loves a label and a pigeon-hole; but after all, even if one has exophthalmic goitre, one still has much else—likes, dislikes, tastes, emotions, preferences, kidneys, bowels, and what not. These matters will surely repay study and a proper adjustment of their relationship may spell the

difference between success and failure. Finally, I would mention drugs. The demand for rest is urgent. Not that variety conducted by a patient, who is told to go home and rest and whose doctor casually drops in, after ten days or so. Still less that variety attempted by placing a patient, already emotional perhaps to the verge of mental derangement, in the ward of a noisy hospital among sights and smells, familiar and innocuous enough to us as part of our daily business, but well calculated to further demoralize an already over-wrought nervous system.

Environment should be as closely adapted as possible to the individual and all channels of disturbance alike to the physical and mental sides closed, and he who is able not only to provide complete rest for the patient's body but who is also able to quieten the disturbed mind; to ward off untoward happenings of a domestic or social nature; to replace for a time active animation by passive vegetation; he is the physician who will compass the greatest measure of success.

Nor does it affect the situation what view we may take of the causation of the disease. Even yet it may be well to remember that, eighty years ago, Graves regarded exophthalmic goitre as a cardiac affection. That fifty years later, in the seventh edition of a well-known American text-book on diagnosis, it still finds a place among diseases of the heart, "as evinced," says the author, "by its increased force and rapid, irregular action." It shows that those acute observers seized upon that manifestation of the disease most likely to give trouble and doubtless they promptly put these people to bed.

If we discard the older view as well as that still active as lately as 1902, that it is an affection of the nervous system, and adopt the now almost universally accepted theory of Moebius and Greenfield that the disease is primarily a disease of the thyroid gland, the need for rest still remains. And the recent work of Kendall, whose researches on the alpha-iodine compound, thyroxin, are a wonderful example of pertinacity, thoroughness and insight and a perpetual remembrance to those under whose auspices he worked, together with the attractive theory of Janney, involving the idea of dysfunction or imperfect production, instead of hyper-function or over-production—even these in no way alter our conviction as to the fundamental importance of rest.

An adequate supply of food may well accompany the mental and physical quietude. We may gather from the admirable work on metabolism initiated by Magnus Levy and elaborated, or perhaps

one ought to say simplified by Du Bois and other recent labourers in the field, that the breaking down process in the bodies of those suffering from toxic goitre is proceeding at a greatly accelerated pace. That consequently, the necessity for a proper supply, and over-supply, of assimilable food is great. Here is an opening for the old warning to "treat the patient" and here even the despised "knowledge of the patient's constitution" may be of use. With ancient art one may rightly combine modern science and there is no reason why the "adequate dietary" should not in the physician's mind be estimated in its proper proportions of proteins, fats, carbohydrates, etc., with their accompanying caloric values. It seems probable, though nitrogenous waste is great, that a generous proportion of each is most suitable, if possible, one-half as much again as the individual would ordinarily eat. Perhaps, I may be here permitted for a moment to refer to the possible effect of certain diets as a preventative of the disease. We in British Columbia, where ordinary goitre is very prevalent and the toxic variety common enough, and apparently on the increase, have in our midst a considerable Japanese population, who appear as a race to be largely immune to goitre in all its forms. I believe that this relative immunity exists also in Japan. Apart from the substitution of rice and fish as staples in place of our bread and meat, there is one interesting variety of diet used constantly, I am informed by Japanese physicians, by all Japanese both at home and in this country and that is seaweed. Seaweed, as we know, contains iodine and iodine one recognizes in the secretion of the thyroid gland and observes its use as a preventative or control in the goitre of adolescence.

I have little to say about drugs. I think suitable medicine has its use in a limited field. A stomachic (if I may venture to use so obsolete a word before so distinguished an audience) may be of value and a proper regulation of the excretory functions will be necessary. Bromides have a place and may assist in securing mental and physical relaxation. Digitalis, though perhaps often administered, is not, I think, of much use. It is desirable enough to employ a remedy which would slow and steady the heart and thereby lessen its work and increase its efficiency, but I fear that one cannot obtain this result with digitalis.

Tachycardia from any cause, particularly a tachycardia such as occurs in thyro-toxæmia produced by an over-secretion or an altered secretion, acting either directly upon the heart muscle or through the extrinsic nerves either by inhibition of the parasympathetic fibres of the vagus or by stimulation of the accelerator

branches of the autonomic nervous system, does not appear to come within the sphere of action of the digitalis group of drugs.

There is a variety of the disease which while exhibiting certain of the symptoms we associate with hyperthyroidism is, nevertheless, benefitted by the use of thyroid tablets. These peculiar cases are probably a combination in one and the same individual of hyper and hypothyroidism, possibly a condition better explained by Janney's idea that there may be an actual deficiency of the thyroid hormone in the circulation because it is converted in the prehormone stage into a toxic product.

Other drugs are in use, quinine, belladonna, ergot, adrenalin, pituitrin; and other methods of nonsurgical treatment among which may be mentioned the use of boiling water injections, applications of cold or heat, Beebe's serum—apparently they have their day and cease to be.

It is not easy to define the results of medical treatment in toxic goitre. There is a singular paucity of information as to the results of every form of treatment. A recent writer in the *American Journal of Medical Sciences* has said, "probably 20,000 to 30,000 operations have been done on this continent for exophthalmic goitre in the last ten years and except for fragmentary data the medical profession is in almost complete ignorance as to the actual results obtained through this large number of operations."

The reason for this has been the want of a standard of comparison beyond that of a pious expression of opinion—a want which we all hope will now be supplied by a ready means of estimating basal metabolism. Already some results have been published, notably by Means and Aub of Boston.

Meanwhile my own impression is that considering the fact that the worst cases are perforce put under the physician and make their exitus in his name, and considering also the initial mortality among patients subjected to surgical treatment, there will be in a large series of cases followed over a long period of time little to choose in the final results, between any method of treatment at present employed.

CO-RELATION OF RESULTS OF TREATMENT BY SURGICAL AND *X*-RAY METHODS

By Geo. H. Binghan, M.D., and
G. E. Richards, M.D.

Toronto General Hospital

THE present paper is essentially a revision of one presented before the Toronto Academy of Medicine two years ago with the addition of two hundred and fifty cases treated since that time, bringing the total reported up to three hundred. The conclusions which we have been led to draw from this study are much the same, but more accurate than was at that time possible.

The importance of the subject has also tempted me to attempt a general statement of the position which this method may now be said to occupy in the therapy of the thyroid gland.

In approaching this subject first from a purely theoretical standpoint, we must ask ourselves this question: In the light of our knowledge of the effect upon living tissue of radiations either from radium or an *x*-ray tube, can we logically expect a modification of the function of the thyroid? If we can, is this modification along definite lines which can be produced at will, or is it merely accidental or occasional, and the method purely empirical with no firm foundation?

In order to answer these questions it is necessary to review one or two facts which have an important bearing.

1. *Structure of the gland.* This is described as consisting of numerous non-communicating acini or follicles of various sizes lined by epithelium nearly cubical in form. Two varieties of these cells exist, of which one secretes the colloid material.

2. The colloid substance contains the active physiological agent which Kendall states to be a crystalline iodine compound. Whatever be its nature, it seems beyond a doubt that hyperfunction is accompanied by an increase in the colloid substance which in turn is responsible for the disturbance of metabolism.

3. *Pathology.* "Several modifications of this histology occur

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Third paper contributed to a symposuim on goitre at the fifty-first annual meeting of The Association, Vancouver, June 23rd, 1920.

during disease conditions, the chief of which are; adenomatous change, cystic degeneration and hyperplasia, the latter being the outstanding feature of the toxic types. These toxic types apparently progress through a rather definite sequence of events until arrested or until death occurs, the important change being hyperplasia and hypertrophy with increase in the epithelial content of the acini, and of the size and number of the latter." This is naturally accompanied by increased secretion of colloid substance with its active physiological agent. The amount of hypersecretion being in some cases enormous, the corresponding disturbance of metabolism is profound.

4. Changes also occur in the cervical sympathetic ganglia and in the thymus. In the latter the consensus of experience is that hyperplasia accompanies the similar process in the thyroid in from 50 per cent. to as high as 90 per cent. of the cases. It is not accessible to surgery at the same time as the thyroid, and introduces a distinct complication with augmentation of the surgical risk.

Physiological properties of x-rays. In view of the above facts, what properties of *x*-radiations have we which can modify the various processes mentioned, and in what manner is this brought about?

It is a well-known fact to all by this time that when any living tissue is exposed to *x*-rays or radium the first effect is stimulation, and the final effect, if the irradiation is pushed too far, is necrosis and death. Between these two extremes we can produce any desired change in a fairly definite manner, and by varying the conditions of exposure can obtain stimulation of the metabolism of a particular cell or the depression of the same within certain limits.

The next fact which we should observe is the law which states that: "Immature cells and cells in an active state of division are more sensitive to *x*-rays than are cells which have acquired their fixed physiological character." Thus the cells of an organ in an unusual state of activity are more easily influenced than similar cells in a normal organ or than the cells of normal surrounding organs or tissue.

Reasoning back along these theoretical lines we would expect any effect which *x*-rays could produce upon the thyroid to take place in somewhat the following order.

1. The hyperplasias should be influenced most, because they depend upon the over-functioning of an epithelial cell, and this may be depressed or modified by *x*-radiation.

2. The adenomatous type being a less highly organized cell

containing much connective tissue and being in a slow state of cell activity, should not respond nearly so well.

3. The cystic type should practically not respond at all. Now since this is almost exactly what happens in actual practice, it seems to me clear that the effect is not accidental or empirical, but is a direct physiological action, and its use based on sound premises. In short, the results we obtain are due primarily to depression of the metabolism of the secreting cells of the gland, and when we fail it is either because we have made a wrong selection of the type of case, or else the cell refuses to respond to the *x*-ray for some reason which has to do with its own individual biology, just as we find certain sarcomata differing in their biological response to irradiation although the cell-types may be exactly similar.

It should here be noted that it is possible though not easy to so far depress the secreting function of the thyroid as to produce myxœdema.

Present position of x-ray method. The general position which this method of treatment may now be said to occupy may best be defined and illustrated by taking up the various types of goitre in turn. I here follow Judd's classification as being the simplest, and also because it fits rather naturally into the purpose of the present paper.

1. *Simple colloid goitre.* These are seen chiefly during adolescence, at puberty, during pregnancy, or occasionally at the menopause.

We fully realize that in many of these cases the condition is nothing more than an exaggerated physiological function, and that rest in bed and medical measures will cure the majority of them. Some, however, occasionally become active or even exophthalmic, and in view of this possibility we believe they should receive treatment since it is not feasible as a prophylactic measure to put such patients at rest in bed for several months—some simple substitute is desired.

In this type the experience of radiologists is favourable almost without exception. Some writers claim 100 per cent. of cures, and all agree that for the treatment of this condition the *x*-ray provides an agent which ranks very high in order of importance. In our own series 90 per cent. of our cases were completely cured. The other 10 per cent. include several which were probably wrongly classified. In most of the failures in this group the symptoms all disappeared, but the swelling of the gland was not materially affected.

A certain number in spite of this become surgical. The number is small, probably about 2 per cent. of the total.

In such cases, however, without fibrosis we believe surgery is needless, and in the great majority of cases is definitely wrong. The result of *x*-ray treatment in this group offers such a strong probability of complete cure that it deserves a fair trial before surgery is considered.

2. *Adenomatous goitre,* with which we shall group all cystic types not complicated by toxic symptoms. The symptoms are those of pressure, the mass is hard, round, definitely encapsulated, and usually moves freely.

This is the type which does not respond well, and if purely adenomatous or purely cystic practically does not respond at all. These goitres are entirely surgical, and we advise against *x*-ray in all such cases.

But there are a certain number of these which are degenerating adenomata or mixed forms with definite activity. In such, relief of most of the toxic element may be looked for, but practically no change in the goitre itself. This aspect is dealt with in the next section in which such forms are more correctly classified.

3. *Toxic goitre.* In this group Judd places the hyperplastic types and the degenerating adenomata above referred to, and referring to the surgical treatment of them says: "It is a well-recognized fact that exophthalmic goitre should not be operated upon during the period of acute exacerbation, and that the steadily increasing intoxication must be arrested before any radical procedure is attempted."

I quote this statement because it is universally accepted as accurate, and secondly because the result of all our experience in *x*-ray treatment of acute thyroids goes to show that in it we have an agent which provides this reduction in intoxication in a large majority of the cases, and in more than half of them it will do this so completely that no operation will be necessary.

The statement we wish to make regarding the management of such cases is that a thorough trial of the *x*-ray method should first be made under proper conditions, and if this fails surgery may then be considered. Very few of our cases have failed to show at least some improvement.

The above statement is based largely upon the observation of the three hundred cases here reported. In these we have tried to recognize two types of the disease, viz.

1. Hyperplastic type. 2. Thyrotoxic type. The former has

been looked upon as the ordinary exophthalmic type of goitre with exophthalmos and tremour predominating.

The thyrotoxic type with chiefly cardiac symptoms and occasionally an exaggerated nervous element has been rather frequent. This is probably the real basis of many cases of "soldier's heart", and in our present series there are ten such cases. It seems important to emphasize this form of the disease as it is much more frequently overlooked than the more common type.

The results of treatment of these toxic cases falls very naturally into three groups.

1. Cured. The cases included here comprise those who have been symptomatically cured at the end of treatment, and have remained so up to the present, so far as it has been possible for us to follow the records. That is to say there has been complete relief of all symptoms and the patient has been able to return to his normal life. It has not been possible for us to have routine metabolism tests carried out, but we have been willing to accept the ordinary clinical report as to the patient's condition at the end of treatment. If the pulse has returned to normal, if tremour and nervousness have all disappeared, if the weight has been restored to normal, etc., we have classed the patient as cured. If any of the cardinal signs remain we have not done so.

In the present series the percentage of cases classed as cured is 50·3 per cent. of the total.

To illustrate the type of cases referred to here.

Case 1. Mr. W., aged thirty-five, patient confined to bed in the hospital where he had been for four months. Previous to admission duration of disease about one year. Treatment had included absolute rest in bed, the usual medical measures including horse serum, and he has also had boiling water injections, but his condition was considered too bad to permit any surgical procedure. All the classical symptoms were present in aggravated form.

He was brought to the *x*-ray department on a ward carriage for the first series. After this the pulse improved and nervous symptoms were much better. In two weeks he came in a wheelchair for the second series. Pulse had now dropped from 130 to 90. For the third series at the end of the fourth week he walked to the department and immediately after this left the hospital. Within six weeks of commencing treatment, pulse had dropped to 72, he had gained twenty pounds in weight, and the collar was reduced three sizes. This case went on to complete cure, and is still well.

Such examples could be multiplied, but this one illustration will serve the purpose of this paper.

2. Improved. The second group are those who have been improved as a result of the treatments, but in whom this improvement has stopped short of complete relief. Some of the symptoms remain—usually some of the enlargement of the gland or of the exophthalmos or both. The improvement has been in the relief of tremour, nervousness, tachycardia, sleeplessness, with frequently a gain in weight. The result of treatment has really been to convert an active toxic goitre into a simple goitre. The patient has now become a much safer surgical risk, and if operation is desirable it can be undertaken at this stage. The amount of improvement has been about equal to that following ligation of the superior thyroid vessels.

These cases have comprised 11·3 per cent. of those showing improvement under treatment.

It is only proper to say regarding these, that some will probably relapse, while some will continue to further improve and ultimately will fall into the first classification.

3. The third group are those in whom no improvement occurred as a result of treatment. These were 5·3 per cent. of the total.

The figures have been arrived at in the following manner: Of three hundred cases treated, two hundred and twenty-eight, or 76 per cent. showed some improvement, sixteen, or 5·3 per cent. failed to improve, and fifty-six could not be accurately classified for various reasons.

Of those which improved one hundred and fifty-eight, or 50·3 per cent. of the total were relieved of all symptoms; twenty-six were improved to such an extent that operation was possible and comparatively safe; forty-four were relieved of the majority of symptoms, but were not operated.

No figures are available showing the frequency of recurrence in those cases treated solely by *x*-ray; but included in the second group are ten cases previously operated upon in whom recurrence had taken place.

When improvement results it usually follows a fairly definite sequence.

Nervousness and irritability. These usually disappear early, and often very promptly. Frequently a decided improvement is noted after the first series of irradiations.

Tremour. This disappears about the same time as the nervous symptoms, taking longer to entirely go.

Tachycardia. The pulse rate in favourable cases is steadily reduced, reaching normal long before the goitre shows much change.

Weight. One of the earliest signs of improvement is very frequently found in the gain in weight, and this is an excellent indicator, not only of the general progress, but also of indiscretions on the part of the patient. A bad lapse will be mirrored in the weight chart.

Goitre. In the early cases there is usually a slow, steady reduction in the size of the gland until it becomes normal. In the prolonged cases so much fibrosis has occurred that reduction is much slower, and may not be entirely complete. In almost all cases it takes several months for full reduction to occur.

Exopthalmos. Here again where the case is comparatively recent and the bulging is mostly due to engorgement of the orbital vessels, the exophthalmos will disappear as the circulatory symptoms subside; but in the old-standing case where fatty deposits have occurred the restoration will be very slow, and in some may not occur. We have one case under observation in whom the eyes are still not normal after eighteen months, but are improving. All the other symptoms have been absent for over a year.

Conclusions

I have tried in this paper to show that this method is a logical and scientifically sound one, which is in no sense advanced as a cure-all, but which if used in suitable cases will produce gratifying results.

It is not a question of *x*-ray versus surgery in any sense of the word. Our duty is to the patient, and if it can be shown that certain procedures or methods provide a means of reducing the intoxication of this serious disease, those methods should certainly be used before operation is thought of. After an experience in treating more than three hundred cases, I am convinced of its value, and that it should be looked upon by the surgeon in the same light as a two stage operation.

Two chief objections have been raised. First, the length of time required. This is only a real objection in a mild case which could be operated at once. The severe case should be given rest in any case, and *x*-ray may be given during that period.

The average number of irradiations required in our experience has been six series at intervals of from two to three weeks, thus spreading the whole treatment over about four months. In view

of the fact that some of our cases have been seriously ill for many months, and in several cases for one and two years, this does not seem too long. In fact, it may even be an advantage to restore the body gradually rather than too suddenly to a normal balance of function of the thyroid.

The second objection is in the production of adhesions and an increased blood supply about the thyroid capsule.

As to this, I have found a great deal of difference of opinion among surgeons, but it seems probable that long continued *x*-ray treatment might cause fibrosis here as it does in other tissues. We, therefore, do not deny that it can occur while admitting that if any case has ever been treated by *x*-rays, and subsequently is operated upon, nearly everything of an unusual nature is blamed on the *x*-ray, as all of us know who have much experience in this kind of work.

Summary

1. The *x*-ray is capable of definitely modifying the function of the diseased thyroid gland in a favourable manner

2. The cases best suited for treatment are the toxic types, and of these the early cases are more favourable than the older more chronic ones.

3. Improvement may be expected in about 80 per cent. of all cases and complete cure in 50 per cent.

4. The length of time required for each case will average about six to eight weeks.

5. Cases which are not definitely cured, but which are improved are made, thereby, much safer surgical risks.

6. Adenomatous goitres do not respond well, and if no toxic symptoms are present the method is not to be recommended.

7. Cystic types without toxicity do not respond at all, and if relief is sought, these together with uncomplicated adenomata are purely surgical.

8. The advantages of the method are the ease with which it may be carried out, its safety to life, its painless nature, and freedom from shock. Its disadvantages are the length of time required, and the possible production of fibrosis of the capsule.

MYELOGENOUS LEUKÆMIA—TREATMENT BY BENZOL AND *X*-RAY

By H. A. Lafleur, M.D.

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AMONG the various methods of treatment recommended for myelogenous leukæmia none has attracted more attention in recent years than that which consists in the administration of benzol. Given alone, or in combination with *x*-ray treatment to the spleen and long bones, the improvement has been so rapid, so marked, and has extended over so long a period, that the idea of spontaneous remission, in explanation of the favourable result, may be confidently excluded.

Starting with the first therapeutic administration of the drug by Von Koranyi in 1912, a considerable literature has grown up around this topic, which has not only emphasized the efficacy of this method of treatment but also drawn attention to its possible dangers. Both of these aspects may be appreciated by reference to the communications of Billings, in the *Journal of the American Medical Association*, 1913, and of Barker and Gibbes in the *Johns Hopkins Hospital Bulletin*, December, 1913.

The following case is an instance in which benzol, combined with *x*-ray treatment, has unquestionably produced a marked improvement not only in the blood picture but on the patient's general health, without inducing any of the untoward effects that in some cases have followed the administration of the drug.

G. H. K., aged forty-eight, came under observation first on May 20th, 1919, complaining of loss of weight and strength, and "a depressed feeling in the stomach". He had had diarrhœa, one or two watery motions with some mucus daily for six weeks. The loss of weight amounted to about twenty-eight pounds. He had become sallow in the last year. He had a slight attack of influenza in 1918, and two or three years ago had suffered from hæmorrhoids. There was no history of serious illness and his habits were good.

The family history was unimportant. *Physical examination*

showed him to be of rather sallow and anæmic appearance. There was nothing in the visceral examination except a slightly palpable liver and a considerably *enlarged, hard and palpable spleen.* The splenic dulness measured 17×11 cm. *Blood examination* on May 29th gave:

Red blood cells..... 3,700,000
White blood cells..... 73,000
Hæmoglobin.....69 per cent.
Differential count, May 30th:
Polymorphs.....46 per cent.
Small mononuclears.....4 per cent.
Large mononuclears.....1 per cent.
Mast cells.....2 per cent.
Myelocytes.....47 per cent.
2 normoblasts were observed in this count.

Benzol was begun on May 30th, m. v. with an equal quantity of olive oil, in capsule, three doses daily, increasing the dose by m. i every second day, and was continued until he left hospital on June 20th.

X-ray treatment was started on June 1st, and continued daily, with an intermission of five days, from June 7th to June 11th, to the date of leaving hospital, June 20th. Blood counts made on June 4th, 14th, and 19th, gave respectively 109,000—114,000 and 48,400 white cells. It is interesting to note the *temporary increase* of the white elements at the beginning of the treatment, which is the rule in most of the cases hitherto reported. Coincidently with the decrease of the white cells there was a marked reduction in the size of the spleen, which became barely palpable.

Mr. K. had planned a trip to the Pacific coast, and as he was feeling much better it seemed advisable to allow him to leave with the caution that he was to continue treatment and to have a careful blood count made on arrival at his destination.

I saw him again on July 31st, and was surprised at the change in the blood picture. Red cells 5,600,000—white cells, *3,000* (an actual leucopenia). There were still a few myelocytes to be found after a careful search.

Benzol was discontinued at once, and as he felt very well there seemed to be no objection to his returning to his home in New Brunswick on the understanding that he should have sufficiently frequent blood counts made in St. John by Dr. Abramson to whom I am indebted for the following:

September 18th, R. C., 4,100,000; W. C., 3,300; H., 75 per cent.
November 13th, R. C., 5,270,000; W. C., 14,500; H., 98 per cent.
December 11th, R. C., 5,080,000; W. C., 6,600; H., 100 per cent. (no myelocytes)
June 11th, 1920, W. C., 15,800 (no myelocytes).

During the period extending from November, 1919, to June, 1920, benzol and *x*-ray treatment were taken intermittently. Writing on June 14th, 1920, Mr. K. states:

"I have been very well indeed for the last six months, but recently my white cells begin to run up again."

He is now again having a course of the combined treatment.

It is probable that the condition is only in abeyance, but this much can be said that no other form of treatment can show as beneficial effects in what is admitted to be an incurable disease, and if it be borne in mind that frequent blood examinations and very guarded dosage are *absolutely essential*, it may be admitted that this is a distinct advance in the therapeutics of myelogenous leukæmia.

THE DIAGNOSTIC VALUE OF THE *X*-RAY EXAMINATION IN PULMONARY TUBERCULOSIS

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SINCE the earliest days of roentgenology, the aid of the *x*-ray examination has been invoked for diagnostic assistance in cases of suspected pulmonary tuberculosis. Passing years with increasing experience have served merely to emphasize the value of this assistance, and to-day its employment is a very important part of the routine examination of the chest. Nevertheless, to one who observes the situation closely, it is apparent that there is considerable confusion abroad concerning the interpretation of the shadows seen on the plate. There is a lack of certainty in distinguishing between normal shadows and abnormal ones, an inability to recognize the *x*-ray signs of early disease and a difficulty experienced in distinguishing the shadows caused by an active lesion from those caused by an inactive one. There is some excuse for this bewilderment, for plates of the chest generally show an abundance of shadows some of which are normal, others being due to the ordinary wear and tear of daily life, are more or less normal, whilst others again are the result of disease, either past or present; in fact, the entire pathological past of the chest is so often revealed on the plate that it tends to confuse the signs of the present. Very valuable assistance in clearing up this point is rendered by the clinician, who has other means for gathering information apart from the *x*-ray examination, and if this assistance is not available, the conclusions drawn from the *x*-ray plate alone may not interpret correctly the exact pathological condition present in the chest. Collaboration is extremely valuable and should never be omitted, although there can be no question, that with a good *x*-ray technique, the diagnosis of pulmonary tuberculosis is possible generally from the plate alone. It is of prime importance, that the *x*-ray technique should be beyond

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reproach and no attempt should be made at interpretation unless the plates are of good quality. Many an erroneous diagnosis is due to an attempt to read poor or medium plates, and also to the unfortunate faculty possessed by some individuals of seeing too much, a faculty which is often aggravated by not understanding what one sees.

Stereoscopic plates, although they may not be necessary always, are of undoubted value, especially in the early case. The soft tissue shadows which are sometimes regarded by the inexperienced as indications of pathological changes, are readily eliminated by a set of stereoscopic plates. They are extremely valuable in orientating a lesion and should be used always when studying the hilus. The fluoroscope has a definite though limited field of usefulness in the routine examination. Observations of the movements of the diaphragm, the action of the heart and a comparison of the illumination of corresponding areas may be made, but it is not safe to depend upon the fluoroscope alone for diagnosis.

Like other methods of examination, the *x*-ray is not infallible, or at least, human interpretation of its shadows is not. It cannot displace the physical examination nor do away with the necessity of securing a proper clinical history in each case. The information gathered from these sources should be utilized when interpreting the plate, especially in early cases. A knowledge of the clinical history and the result of the physical examination of the chest may prevent the roentgenologist from assuming that pulmonary tuberculosis is present because there are certain shadows in the lung area, or absent because the plate is negative. The latter assumption, however, is a rare one for a roentgenologist to make, for the sins of *x*-ray interpretation generally consist in finding tuberculosis which is not present, rather than overlooking it when it is. This failing is not the fault of the *x*-ray, but of the individual who interprets, and an occasional misinterpretation is not a sufficiently good reason for its non-employment as a matter of routine.

In cases which have definite and positive physical signs, the *x*-ray is not required to indicate the diagnosis, but it will give more accurate information with reference to the extent of the disease than can be elicited by the physical examination. The presence of an *x*-ray shadow does not always mean the presence of pulmonary tuberculosis, nor does the absence of physical signs mean the absence of disease. The absence of symptoms and of physical signs when a doubtful shadow is present renders extremely doubtful, the presence of disease. On the other hand, if there are physical signs present in

the region where the abnormal shadows are present, it is conclusive evidence of the presence of pathological changes in that area. Again the presence of a definite shadow, even though faint, if supported by clinical evidence of disease, is strong presumptive evidence that the shadow is due to pathological changes in the lung, although there may not be any recognizable physical signs present in that area at that time. If doubt should remain, it would be advisable to repeat the *x*-ray examination at a later period, for not infrequently physical signs may be fleeting or intermittent early in the disease, and it is only by repeated physical and *x*-ray examinations that eventually the diagnosis may be established. In these cases, respiratory symptoms may be entirely absent, but loss of weight, anæmia, rapid pulse, gastric disturbance, etc., may be the prominent features, and the *x*-ray examination in the absence of physical signs in the chest, may confirm a suspicion or dispel a doubt.

The signs of pulmonary tuberculosis on the *x*-ray plate are interesting and varied, the variation depending largely upon the stage of the disease. It is doubtful whether there is anything on the plate which strictly speaking may be said to be absolutely distinctive of pulmonary tuberculosis in its earliest stages; that is, the early invasion of the lung by the tubercle bacillus probably does not produce a shadow which could not be produced by the early invasion of other bacteria. It is possible, however, to recognize early that some pathological process is present in the lung, and as the tubercle bacillus has a well-known predilection for attacking lung tissue, it does not seem to be too great an inference to regard the pathological changes as being due to the invasion of the tubercle bacillus especially if physical signs or symptoms are present. Changes in the tissues result in changes in their densities, and consequently a variation from the normal in the shadow cast on the *x*-ray plate. These shadows may be classified in two ways, namely, first, as regards the quality of the shadow, and second, as regards the special structure of the lung involved. The variations in the quality consist of (1) light cloudy or filmy shadows seen early in the disease, (2) the blurring of detail, due to infiltration, (3) mottling, fine or coarse, seen as the condition advances, and, (4) the dense shadow of the healed lesion; dense and irregular when fibrosis is present, or dense and sharply circumscribed if calcified. The special structures involved include, (1) the bronchial and peri-bronchial structures, (2) the parenchyma of the lung, and (3) the glandular elements at the hilus and at the points of bifurcation of the bronchi and bronchioles. In the peri-bronchial type, the distri-

bution is linear, the blood vessels, lymphatic and bronchial shadows being accentuated. Small separate nodular shadows either sharply defined or hazy but distinctly beaded in appearance, may be seen along the ramifications of the bronchioles. This appearance is not of great value unless it extends out to the periphery. Pathological bronchial shadows are easy to recognize in the upper portion of the lung, but in the lower third where normally the bronchial shadows are more pronounced, it is difficult to determine when they are really pathological. At the left base they are over-lapped to a considerable extent by the shadow of the heart, and the recognition of a limited lesion in this area is extremely difficult. Increased bronchial shadows alone, especially if bi-lateral, are seldom of importance in the diagnosis of pulmonary tuberculosis, because they are so frequently found in so-called "normal" chest, or may be indications of chronic bronchitis or the result of a previous non-tubercular infection. If due to tuberculosis, the bronchioles are generally distinctly beaded and associated with signs of disease in the parenchyma, such as mottling. Shadows in the inner third alone, that is near the central shadow of the chest, are regarded generally as likely to be non-tubercular in origin. When the parenchyma of the lung is involved, the characteristic feature is a mottling which is not associated with the bronchial shadows. Consequently the distribution is irregular and not linear. Areas more or less clear are seen between the individual nodules giving the appearance of mottling. An interesting feature is that with the very fine mottling of miliary tuberculosis, the physical signs may be entirely absent.

In order to obtain the most that is on a plate, it should be studied carefully and systematically. Each side should be divided into regions and examined minutely, namely, the apex, subclavicular region, middle third, the entire periphery, the hilus, interlobar fissures and the lower third. Indications of early pulmonary tuberculosis are found generally in the upper third, sometimes in the middle third, and seldom in the lower third. The periphery of the lung is a most important area, for it is usually the site of the initial lesion, although it may not always be discovered. When present, this lesion is seen as a faint cloudy shadow which may not give rise to physical signs although clinical evidence of disease is present. If the lesion is at the apex or superficially in the axilla, the physical signs of early involvement usually can be made out. From the periphery, the early invasion may be traced along the bronchial lymphatics to the root of the lung, the general appearance

often being that of a fan or triangle, the apex of which is at the hilus and the base at the periphery, the ribs of the fan being formed by the thickened bronchial and lymphatic shadows. As the condition advances, the bronchial ramifications become accentuated and beaded, the lung tissue between the bronchioles gradually becoming clouded and the resemblance to the fan disappears. With further advance, definite finely mottled shadows distinct from the bronchial shadows appear in this cloudy area. When this mottling is seen, doubt of the diagnosis is set at rest, for it is distinctive of pulmonary tuberculosis, and usually when it is present, rales may be heard. In the next stage, the mottling becomes coarser in appearance due to a fusion of the finer shadows, the disease extends to new areas, and eventually to the lower lobes. The hilus shadows, which increase in size and become blurred early in the disease, soon lose their identity, becoming merged into the general mottling of the lung. Breaking down occurs in the mottled areas, with the formation of cavities, the recognition of which, on the *x*-ray plate is not always an easy matter. If small and deep-seated they may easily be overlooked. At other times, they are visible only in certain positions of the patient. If the cavity is surrounded entirely by dense pathological tissue, it may escape observation. Often cavities readily made out by physical examination, cannot be identified on the *x*-ray plate. The appearance of a typical cavity is characteristic; the thickened white ring surrounding, if empty, the dark clear air shadow. If both air and secretion are present, the horizontal level line of the latter is diagnostic. If the cavity is filled entirely with secretion, it may be possible to recognize the more or less circular area of increased density, but this is not found frequently.

Arrest of the disease may occur at any time, either entirely or partially. If the disease has not produced cicatrization, it is possible for it to clear up without leaving behind a permanent record of the invasion, although this is unusual. Generally, when healing occurs, the shadows seldom disappear entirely. They diminish in size, and although the signs on the plate may change in quality, some indication of previous disease generally will remain. In fact, the *x*-ray signs in a chest which has been the seat of previous disease are frequently as plainly evident as are the signs of a recent infection, and usually they are more distinctive. Care must be exercised not to regard them as indications of an active lesion. Again, in healing, the inflammatory area surrounding the lesion becomes smaller, the blurring becomes less marked and the outlines

more sharply defined. The glandular and hilus shadows also become less diffuse, smaller and more clearly outlined. The regions in which signs of a healed lesion usually are found on the *x*-ray plate naturally are those in which active disease is most common, namely, the apex, middle third or at the hilus, although they may be present in any region which has been involved. Healed lesions are not constant in appearance. Most frequently they appear as small dense more or less circular shadows with clearly defined margins due to fibrous or calcareous changes and frequently surrounded by a small area of emphysema. If small and deep-seated the healed scars are not likely to give the slightest indication of their presence on physical examination. Sharp outlines indicate old quiescent or healed lesions; active lesions usually are blurred, fading away insensibly into the surrounding tissue. Again, the healed lesion may be represented by a diffuse shadow, seen especially at the apex or in the subclavicular region, and finally it is not uncommon to see a fairly dense linear shadow in the region of one of the interlobar fissures, particularly the right upper. In connection with the latter, it is repeated that careful search should be made of this region. It is not infrequent for pulmonary tuberculosis to commence in the region of one of the interlobar fissures, and extend to the adjacent lobes. On the *x*-ray plate, involvement of this area is manifested by a fairly dense band-like shadow which is transverse or slightly oblique in direction. The width and appearance of this shadow will depend upon the extent to which the adjacent lobes are involved, and upon the degree of activity present. If involvement is slight, it will be narrow with fairly clear-cut margins; if extensive it will be broad and blurred, diminishing in density towards the margins.

Another important region on the *x*-ray plate is the root of the lung. The hilus shadow, consisting of a body, an upper and a lower horn is more or less convex towards the median shadow of the chest, and concave towards the axillary border. The upper horn is short and broad; the lower is long and tapering, projecting downwards and outwards towards the diaphragm. The lower horn is clearly visible on the right side, but on the left it is overlapped by the shadow of the heart. Normally, a clear shadow exists between the horns and the median shadow of the chest. Owing to the involvement of the glandular elements, the hilus shadow becomes enlarged and blurred early in the disease, and it may be that the first indications of tuberculosis are detected here, especially in children. With the increase of the shadow, there is a corresponding

encroachment upon the clear space between the horns and the median shadow of the chest, and a prolongation of the horns altering materially the crescentic shape of the hilus shadow. These changes are not caused by tuberculosis alone, but may be due to any affection of the parenchyma of the lung, consequently they are seen frequently in children associated with or following infectious diseases with respiratory involvement. Occurring in a patient in whom pulmonary tuberculosis is suspected it would require a most careful search to be made for indications of the primary lesion in the area drained by the lymphatics radiating to the hilus. If the hilus shadow is blurred, it is strongly suggestive of the presence of recent inflammatory changes, although these changes need not necessarily be due to tuberculosis; if it is dense and clearly outlined, it merely means that some inflammatory process has been present, which is now completely healed.

Another point of diagnostic importance is the size of the heart. In pulmonary tuberculosis the heart shadow is generally small, central and vertical. It is rare to find a large heart shadow, even in an early case. The small heart is not necessarily an indication of pulmonary tuberculosis, but it may show at least that there is a predisposition to the disease. Excessive calcification of the costal cartilages is another feature observed frequently in pulmonary tuberculosis.

It will be understood readily from the above, that the *x*-ray appearances of pulmonary tuberculosis will vary with the stage of the disease. The shadow cast by the pathological tissues may be of any degree of density, including the faint filmy shadow of the very early case, the mottling of the more advanced disease and the dense shadow of the healed lesion. At times, the first indications of disease will be detected by the physical examination; at other times the *x*-ray alone will show the early changes but the *x*-ray affords the most accurate information that can be obtained apart from the autopsy, at least for the extent of the disease. Usually when physical signs are present, the *x*-ray will demonstrate the area of involvement to be more extensive than was indicated by the physical examination. No method nor combination of methods at present employed, will detect invariably the earliest signs of disease in every case, nor decide positively at all times the activity or otherwise of a lesion. The *x*-ray will demonstrate the site and the extent of the tissue changes, and although usually it is possible to infer from the *x*-ray plate alone, whether the lesion is active or not, this decision should be left to the clinician to make, who with a

knowledge of the case obtained from many sources, including the *x*-ray, is in the best position to express an opinion upon this point. Accordingly, to discover on the *x*-ray plate, indications of pathological changes in the tissues, usually requires the support of clinical evidence of disease, before concluding that the changes can be due only to tuberculosis. Otherwise the discovery may consist of nothing ing more than the recognition of a condition which has long since ceased to be a matter of medical interest. The clinical support need not be confined to the presence of physical signs within the chest, but may be manifested by the presence of general symptoms of ill-health. Definite indications of pathological changes in the lungs, so often are seen on the *x*-ray plate, not only in individuals who apparently are in perfect health, but also in those who give no history of having suffered from a serious illness at any time, that one is forced to the conclusion that tuberculosis of the lungs is frequently a mild disease, often running its course from onset to recovery, unrecognized.

A CONSIDERATION OF THE THOMSON-CURTIN OPERATION FOR DETACHED RETINA WITH REPORT OF TWO CASES

By L. De V. Chipman, M.D.

St. John, N. B.

IN 1915 Dr. Edgar S. Thomson and Thomas H. Curtin published a paper on "Detachment of the Retina with a preliminary report on a new operative procedure."* After giving a résumé of the literature on the subject, they take up the two main problems of the cause and the treatment of the detachments.

The cause is of the utmost importance, because, if detachments are due to a primary degeneration and shrinking of the vitreous, with consequent pull on the retina, according to Leber's and Müller's theories, no surgical procedure would be of any avail. After a consideration of the three main theories of the cause of detachments: that mentioned above, Raehlmann's osmosis theory, and Arlt's theory that detachment is due to a secretion or exudation from the choroid pressing against the vitreous, they conclude: "Taking everything into consideration, it seems to us that, in the present state of our knowledge, we are not justified in assuming anything more than that retinal detachment occurs as a result of a lymphatic derangement leading to exudation from the choroidal vessels."

The other main problem was the question of treatment, which resolved itself into the problem of how to get rid of this fluid. A study of the cases reported showed that the old procedure of pilocarpine sweats and long rest in bed has proved a failure, and has been abandoned by many surgeons. The only treatment which up to that time had held its own, seemed to be scleral puncture, and Casey Wood says that quite a number of brilliant and permanent cures followed persistent treatment and repeated operations.†

With the above premises in mind: that detachments are caused by a temporary exudation of serum from the choroid forcing

*"Annals of Ophthalmology," January, 1916.

†"Ophthalmic Operations," Chicago, *Cleveland Press*, 1911, ii, 1360.

the retina away, and the only cures effected by repeated punctures of the sclera, the logical treatment seemed to be a procedure which would afford permanent drainage to this fluid, if possible, or, at least, allow its frequent removal without trauma. This was obtained by trephining the sclera with an Elliot trephine, after raising a conjunctival flap, and repeated aspirations of the fluid with a syringe. Seventeen cases were operated on in this manner and, under favorable circumstances, with very encouraging results.

The writer happened to be Dr. Thomson's house-surgeon at the time the work was commenced and had the privilege of assisting at most of the operations and was thus able to follow the results personally.

The first case operated on was a brilliant success: a spontaneous detachment in a man of twenty-one years, including almost the lower half of the retina. Patient first noticed blurring of vision of left eye September 22nd, 1914. Visited the hospital October 1st, with vision O. S. reduced to hand movements in lower and outer part of the field; upper field blind. He was treated in the usual way with atropine, bandage, and pilocarpine sweats till October 12th, with no improvement. He was then operated on by Dr. Curtin, a scleral trephine being done, but no aspiration. He was kept in bed till October 22nd. On that date 25 minims of serous fluid was aspirated, the needle being inserted through the scleral opening. Fundus examination at the time of aspiration showed the retina to have fallen back into place. The vision, next day, was found to be fingers at eight feet and gradually increased till on November 16th, it was twenty-fortieths. On December 22nd, it was twenty-thirtieths, and on January 27th, it was up to twenty-twentieths with proper correction. He returned to work on November 23rd, 1914, and at last report, about a year ago, had had no recurrence of the trouble.

A second successful case was operated on December 12th, 1914. This was a traumatic detachment in a man of twenty-three years. Twenty minims of fluid were withdrawn and complete reattachment secured. The vision improved from fingers at one foot to twenty-seventieths. The case was complicated by an old retino-choroiditis which would account for the reduced vision.

Fifteen other cases in all were operated on in the series but most of them were old long-standing cases, or complicated by high myopia or retinal rents so that no very brilliant results were expected and none were obtained, though a large proportion showed temporary improvement.

In spite of the excellent results obtained in the only favourable cases operated on, the writer was rather dubious about the value of the procedure and hesitated long before operating on a case of his own. I have, however, two cases to report which will add at least one to the small number of successes.

Case 1. Man, of forty-seven years, with traumatic detachment following a blow from a shovel handle. The accident occurred November 29th, 1919. Examination showed a large detachment involving the upper outer quadrant. Vision was entirely lost in the lower half of the field, patient seeing only man's head and shoulders when looking directly at him with the injured eye. A scleral trephine was done December 1st, and one-half c.c. of clear serous fluid withdrawn. A fundus examination was not made at the time of operation but the following morning the detachment had disappeared and hand movements could be dimly seen in the lower field. A second aspiration was done through the same opening on December 5th, but no fluid obtained. At time of dismissal from hospital December 9th, the fundus appeared normal and the field of vision was restored, except for a small area in the lower nasal quadrant. Examination on December 20th showed an apparently normal fundus with field completely restored, except a small triangular area opposite the site of the trephining. Objects still appeared somewhat hazy in lower field, however. The trephine opening was distinctly visible beneath conjunctiva.

Patient was last examined January 15th, 1920, when there was no dimness of vision in any area and central vision was twenty-twenty.

Case 2. Man, sixty-five years of age, with large flat detachment on temporal side, three weeks' standing. Vision was reduced to hand movements in temporal field, the nasal field being blind. As the other eye had been lost previously, operation was undertaken, the sclera trephined and aspiration attempted but only three minims of fluid obtained. During the ten days stay in the hospital there was little apparent improvement but two weeks after dismissal, examination showed a central vision of twenty-two hundredths and a widening of the field.

The technique followed was that described by Dr. Thomson. A conjunctival flap including the capsular tissues is carefully raised and a two or three mm. trephine used, the opening being made far back and as near the lower limit of the detachment as possible. In aspirating, the needle should be thrust back into the middle of the detachment and the fluid aspirated as long as the

syringe works easily. If there is difficulty in withdrawing the piston, the retina has come in contact with the point of the needle and it should be at once withdrawn slightly or its position shifted so as to avoid puncturing the retina. The flap should finally be sutured into place.

No one realizes better than the writer that such a small series of cases, even when including successes in most of the favourable cases, is no ground for great optimism in the treatment of detachment of the retina. But when one considers that according to Vail's carefully complied statistics of 25,000 cases* only about twenty reliable cures could be counted, one is tempted to become elated over any procedure which offers even a prospect of cure.

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*Vail—"An Inquiry into Results of the Established Treatment of Detachment of the Retina and a New Theory," *Am. Opth.*, 1913, xxii.

THE LABORATORY DIAGNOSIS OF SYPHILIS

By W. S. Lindsay

Professor of Pathology, University of Saskatchewan

THIS is the first meeting of the Medical Association since the establishment by the University of Saskatchewan of a laboratory for the investigation of clinical material and when your committee asked me to read a paper before you I thought it would be fitting to explain the nature of the work we hope to be able to do for you and to endeavour to give you the pathologist's, as distinct from the clinician's, point of view of that co-operation which is essential to the successful working of a clinical laboratory.

But the general interest now being shown in the problem of venereal diseases and various questions that have been put to me have made me think it advisable to go into these aspects rather more fully than I had at first intended and to exclude the more general topics which I had planned to discuss.

These questions have made it appear that some of you are uncertain as to the exact value that should be placed on the result of a Wassermann reaction. Does a positive finding mean syphilis in every case? In what cases does a negative reaction absolutely exclude this disease? And more disturbing still, what are we to think when a blood sent to two laboratories is returned positive by the one and negative by the other? These and similar remarks have shown that the medical man of to-day is not content to accept unreservedly the dictum of the pathologist, that he is constantly on the alert checking up the pathological findings with the clinical condition of the patient and that while in the case of the Wassermann every one admits its great value, the practitioner wants to know exactly how far he can depend upon it, in what cases, if any, it is likely to fall short, and if such cases do exist what further diagnostic tests are available. My paper will therefore be taken up with the laboratory diagnosis of syphilis. In it I am giving you no new material but I hope to present before you the various methods for diagnosis and for checking the results of treat-

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ment and to make clear, if any doubt existed, the meaning of the reports sent to you from the laboratory.

The first and most conclusive proof of the nature of a case of syphilis is the finding of the spirochæta pallida in the lesion. Unfortunately this is a practical diagnostic measure only in primary cases. Since Schaudinn's original paper showing the causal relationship of this organism to the disease, the spirochæte has been searched for and found in almost every variety of syphilitic lesion but only in the primary sore is its presence so readily detected as to warrant the search part of the routine examination of every case. From the first appearance of the chancre the organism can be found and a diagnosis thereby established some time before the blood changes have taken place which are recognized by the Wassermann reaction. Its detection is simple. The sore is cleaned and a little serum, free from blood, is allowed to ooze out from the raw surface. A drop of this serum is examined by dark ground illumination and the characteristic shape and movements of the organism at once give an unmistakeable diagnosis. If it is impossible for the patient to come to the laboratory for examination a drop of the serum may be collected in a capillary tube which should then be sealed and sent immediately to the pathologist. Unfortunately other spirochætes may be present in such preparations and the zeal of microbiologists has resulted in a long list of various spirochætes with which the pallida must not be confused. Starting with the large clumsy looking Refrigens, a gradually increasing number of more or less harmless types have been described. The dark ground, however, shows us the organism in its living motile state, and though some such as the Spirochæta Microdentium resemble the pallida in every particular except movement, by this method the diagnosis can be made absolute. The spirochæta microdentium may be present in the mouth and it is therefore dangerous in oral lesions to diagnose syphilis by any method of staining. In genital chancres, in circumstances where the dark ground is not available, the diagnosis may be safely made by staining films of the exudate by Fontana's method* of silver deposi-

*_Fontana's Method._ Smears are dried in air and are fixed by covering several times with 20 per cent. formalin in 1 per cent. acetic acid. Wash in water and cover with 5 per cent. tannic acid in 1 per cent. carbolic. Heat until steam rises but do not boil. Allow to act for one minute. Wash well in water and pour on ammoniated silver solution heating till steam rises and allowing solution to act for one minute. Wash well and dry. The spirochætes are brown or black on a light field.

The silver solution is made by adding ammonia drop by drop to a ·5 per cent. solution of silver nitrate until turbidity is produced. Excess of ammonia removes this turbidity and ruins the solution.

tion, or by one of the other standard methods. One cause on failure is found in the use of antiseptic dressings before the examination, which may render the finding of the spirochæte impossible. In these cases a saline dressing should be applied and the examination made a couple of days later.

After a varying length of time from the appearance of the primary sore, blood changes take place and the examination of the serum now yields a positive Wassermann and after the disappearance of the chancre this reaction becomes our main guide in the diagnosis of the disease.

First described by Wassermann and Bruck in 1906, this test has been used by thousands of observers in countless numbers of cases in the study of syphilis, and it is necessary for us to have a clear understanding of the principles underlying it before we can hope to criticize its results intelligently. In 1901, Bordet showed that the principles of complement fixation could be applied to the diagnosis of infection. It was known that following infection with a given organism, for example, the *Bacillus Typhosus*, antibodies were developed in the plasma and body fluids of the patient. There are several types of these antibodies but among them is a substance known as amboceptor or immune body and as a result of its presence the body fluids are able to destroy and dissolve the invading bacteria. It was found that there is present as well in all plasmas, normal as well as immune, another substance—Complement—and in the reaction which takes place resulting in the destruction of the bacteria, there are three essential factors—the bacteria themselves, the immune body, and the complement; also that, while each different organism requires its own specific immune body, the complement is the same for all. There is therefore one complement and as many immune bodies as there are types of bacteria. Another fact was also demonstrated—namely: that in the reaction the complement is used up. Bordet then argued that if a patient was infected with an organism, an immune body specific to that organism would be produced and that if a mixture were made of the organism, the patient's serum containing immune body and a normal serum containing complement, the complement would be used up. Testing for complement will then show whether the reaction has taken place or not. The presence of complement would show that the serum did not contain the immune body specific to that organism and that the organism used was not the cause of the infection. The absence of complement would snow that this immune body was present. All that was necessary then

was to find a test that will demonstrate the presence or absence of complement. Such a test substance can be prepared by adding to a suspension of sheep's red cells a sufficient quantity of the serum of an animal (e.g. the rabbit) which has been immunized by the previous injection of several doses of sheep's red cells. Such a mixture is called a suspension of sensitized corpuscles, because on the addition of complement they go into solution. By the addition of such a suspension we can therefore determine the presence or absence of complement. If complement is present the cells dissolve and a clear red solution results. In the absence of complement the fluid remains turbid, and the cells slowly settle down, leaving a colourless supernatant fluid. Here then is our test complete. Should we be required to determine whether a patient is infected with any particular organism, we take an extract of that organism, known as the antigen, and add to it the patient's serum, and some guinea pig's serum, which contains complement. After incubation till the interaction is complete add the suspension of sensitized corpuscles. A turbid fluid with settling of the cells indicates a positive result—a clear bright red solution is a negative.

Wassermann and Bruck then proceeded to apply this reaction to the diagnosis of syphilis. They could not at that time grow the spirochæta pallida, so they took as their antigen the extract of organs known to contain large numbers of spirochætes and naturally selected among others an extract of a congenitally syphilitic liver in which the spirochætes were present in enormous numbers. With this antigen they repeated Bordet's test and found that when the serum of a syphilitic was treated in this way no destruction of the sheep's cells occurred, while if the serum was non-syphilitic, the cells were quickly dissolved. This then was the beginning of the Wassermann reaction and it seemed to be a specific test worked out from known facts.

Belief in the specific nature of the test, however, received a great blow when it was found that it was unnecessary to use a liver containing spirochætes. An extract of normal liver or of heart or of any one of many other organs gave the test as well as an extract of syphilitic liver. This destroyed the belief in the specific nature of the reaction and immediately doubts as to its value were expressed. It was found however, that while the basis on which the reaction had been worked out was false, nevertheless the reaction held. In the presence of an extract of heart tissue or liver, or whatever other organ was used the serum of a florid syphilitic would invariably deviate complement, while the serum of non-syphilitic individuals seldom if ever had this power.

The nature of the substance extracted from the heart muscle which is responsible for this reaction has never been definitely determined, but it is apparently of the nature of a lipoid such as cholesterin or lecithin and alcoholic solutions of these substances have the power of acting as an antigen in the place of the extract of heart muscle, but are not quite as sensitive so that at present, although there are many antigens in use, the most popular is an alcoholic extract of heart muscle to which has been added a small quantity of an alcoholic solution of cholesterin.

In syphilis there is present in the plasma a lipoidophilic substance which binds the antigen and complement and in the Wasserman reaction we test for the presence of this lipoidophilic substance in the manner in which I have already described and read off the results in the same way, hæmolysis indicating a negative, non-hæmolysis a positive result.

But the question will be raised—Is this lipoidophilic substance found only in the serum of syphilitics? Unfortunately we have to admit that normal serum may contain the same or a similarly acting substance, but it is never present in as large an amount as is found in practically every syphilitic. The reaction therefore must be so carefully standardized that the small amount that may be present in normal serum does not give a positive result while at the same time any increase above the normal will be shown. This has been done and every batch of tests is carefully controlled to guard against this possible source of error.

Again—are there any abnormal conditions other than syphilis in which the lipoidophilic content of the serum is increased. In the early days quite a formidable list of diseases was compiled which might cause confusion. It included such conditions as tuberculosis, scarlet fever, malaria, yaws, leprosy, and many others. But as the technique improved it was found that with the exception of yaws, also spirochætal in origin and closely resembling syphilis, and possibly also leprosy, both of which are so rare in this country as to be negligible, it was only in syphilis that you get a sufficient increase in these lipoidophilic substances to give a positive result. One other exception should be noted. In a few cases following general anæsthesia the blood may give a positive reaction for a short time. Some of the positive results obtained at one time in other diseases were probably due to imperfections in the earlier techniques, but in most, latent undiagnosed syphilis was the source of the apparent inaccuracy. Long series of observations continually being made only serve to emphasize this conclusion.

I have gathered together here a few of the observations made on this point by various observers:

EXAMINATION OF NON-SYPHILITIC CASES*

	Total Cases	Positive Results	Per cent.	
Boas	1927	5	0·25	(1 = leprosy)
Bassett-Smith	146	2	1·4	
Browning and MacKenzie	101	1	1·0	(? phthisis)
Muller (healthy cases)	2000	1	0·005	
" (various diseases)	5000	220	4·4	(100 later showed syphilis)
Craig	2643	11	0·4	(2 later admitted syphilis)

It is thus evident that the number of cases in which a positive result has been obtained in supposedly non-syphilitic cases is very small and considering the tendency of syphilis to remain latent for years, it is not unlikely that in some at least the positive result was not misleading but was the only evidence of a hidden infection.

A complete positive result can therefore be taken as diagnostic of syphilis. Those cases in which the reaction is incomplete must be regarded as doubtful and the reaction repeated possibly after provocative injection of salvarsan or similar product. Such results are, however, strongly suggestive of syphilis. Where the result is reported as a "Trace" it can hardly be considered as suspicious and would be of importance only in a treated case when it would indicate the necessity for further treatment.

Unfortunately at present there is no standard method of reporting results, so that it is difficult to tell from the report exactly what degree of deviation is present. Some laboratories use plus and minus signs in various combinations to indicate the strength of the reaction while others express by a number the condition of each tube, as a rule using 4 to indicate complete absence of hæmolysis, while 3, 2, and 1 mean hæmolysis in increasing amounts. Unless the practitioner thoroughly understands the method employed in reporting, it is impossible for him to make accurate deductions from the reports he receives. The adoption by all laboratories of a simple standard method of reporting would undoubtedly be a great advantage to the practitioner.

The next point to consider is the value of a negative report, or in other words to see in what proportion of cases of known syphilis do we find a positive Wassermann. This varies greatly

*The figures on which this and other tables are based were obtained from Medical Research Committee, Special Report Series No. 21.

in the different stages of the disease as a reference to this table shows.

EXAMINATION OF KNOWN SYPHILITIC CASES

	Boas		Fildes and McIntosh		Muller	
	Total Cases	Per Cent Positive	Total Cases	Per Cent Positive	Total Cases	Per Cent Positive
Primary	137	72·3	33	93·9	1320	58·1
Secondary	747	97·6	109	99·0	3500	99·4
Tertiary	167	92·8	195	97·0	510	99·4
Latent, Early	363	40·0	..	..	4600	68·7
Latent, Late	185	47·0	..	..	4800	35·0
Tabes Dorsalis	58	69·0	..	..	468	60·7
General Paresis	444	97·3	..	..	386	97·4
Congenital	155	96·1	35	100·0	..	..
Control	1927	0·2	..	..	..	..

As would be expected we find in primary cases a great divergence in results depending on the length of time which had elapsed from the appearance of the sore. A negative result therefore has little value in excluding syphilis in these cases. Here, however, we are able to supplement the test by a direct examination of the sore and if there is still doubt a second test after a short interval will probably clear it up.

The percentage obtained in secondary, tertiary, and congenital cases and in general paresis is so high that a negative Wassermann must cause considerable doubt as to the accuracy of the diagnosis, but it should be noted that in general paresis this high figure was only obtained after examination of both blood and cerebro-spinal fluid. It is not uncommon for the cerebro-spinal fluid to be positive while the blood yields a negative result.

In latent syphilis, both early and late, and in tabes a negative result is so frequent that the validity of the diagnosis is not greatly affected. A positive confirms but a negative does not contradict.

Efficient treatment causes a diminution of the reaction and the blood eventually becomes negative. Such a result does not necessarily mean that the disease has been completely eradicated. It does mean that there is no active disease at the time, and if a check is kept on the condition of the blood, a recurrence will be detected before any symptoms or other signs are manifest. It is therefore necessary for a patient apparently cured to have his blood repeatedly examined at three month intervals during the first year following the cessation of treatment, each six months during the second year, and occasionally, perhaps at yearly intervals, for some time after that.

Lastly we have to consider the very embarrassing que

which I suggested in the early part of this paper. What are we to think when we send the same serum to two laboratories and get a positive result from one and a negative from the other? Such results have undoubtedly been obtained and they constitute a serious indictment of the reaction. There is no evading this point. The same individual cannot at the same time have a positive and a negative reaction. But we have to remember that in the Wassermann test we have a quantitative estimate of the amount of lipoidophilic substance present in the blood and if this amount exceeds a standard empirically determined we say the blood is positive, if below this standard it is negative. The methods employed in its estimation vary, and it would not be very surprising if we found that in certain cases an estimate at one laboratory placed the amount as above the standard while another placed it below. The question that we have to determine is how frequently this occurs when the competence of both serologists is beyond question.

To determine this point series of tests were carried out in Germany and in Britain and I will lay before you the results obtained by the Medical Research Committee of Great Britain in a series of tests carried out during the war.

In this investigation blood was taken from a number of cases including both supposedly syphilitic and non-syphilitic cases and portions of the same samples were sent to each of three serologists, no information being supplied regarding the case. The method employed by each varied more or less from that used by the others. In all 104 samples were tested with the result shown in this table.

	Complete Agreement	Minor Disagreement	Serious Disagreement	Totals
Primary, untreated	10	4	1	15
" treated	4	..	..	4
Secondary, untreated	16	2	2	20
" treated	5	4	2	11
Tertiary, untreated	7	..	..	7
" treated	3	2	2	7
Late nervous	..	..	1	1
Latent	3	..	..	3
Congenital	3	..	..	3
Diagnostic	2	1	..	3
Non-syphilitic	25	2	3	30
	78	15	11	104

In minor disagreements I have included those results which differed merely in degree—that is in all these cases the reports were in agreement as to the positive or negative condition of the

patient so that there was no conflict in diagnosis. In ninety-three out of the one hundred and four cases, therefore, all three agreed as far as the result to the patient was concerned. But in eleven the disagreement was greater than this and requires further examination. One of these can be excluded as the error was clerical and the examination of the records showed that all three observers had obtained a complete negative. The remaining ten are shown in this table.

Case No. Type of Case	"A"	"B"	"C"
8—Tertiary, treated	−*	±	+
12—Secondary, treated	−*	+	+
17—Tertiary, treated	−*	+	+
19—Secondary, untreated	−*	+	+
23—Secondary, untreated	−*	+	+
25—Secondary, treated	−*	+	+
66—Primary, untreated	−*	+	+
71—Scleroderma	−	+*	trace
80—Tertiary, untreated	−*	+	+
99—Carbuncles	+	+	−*

I have placed an asterisk after the result which was eventually shown to be inaccurate.

Evidently then there is some basis for the criticism implied in the question, but I would submit that it is not so great as would appear at first sight. It will be seen that observer "A" who used a method of his own, differing materially from the others and from the original Wassermann technique, was the source of error in eight out of the ten discrepancies. These inaccuracies are therefore evidence not so much of the fallibility of the original Wassermann but of that modification of it which this observer has introduced. This leaves two errors only for observers "B" and "C". "C" is responsible in case ninety-nine and in a second sample sent him he returned a positive result. "B" is apparently wrong in case seventy-one.

A fourth observer examined one hundred of these sera and in every case his results corresponded with both "B" and "C" except in case seventy-one, where he agreed with "C" and case ninety-nine, where he agreed with "B". That is, he was correct in every case. So taking the totals of "B", "C" and "D" we have three hundred and eight Wassermanns with two errors, or two-thirds of one per cent.

When tested by actual figures this supposed conflict of results which has given rise to considerable distrust really does not exist. There are few tests or clinical signs on which we rely for diagnosis that can show anything approaching as good a record. I trust that

if any of you have felt doubts as to the value of the Wassermann that these figures will help to reassure you.

These tests do not exhaust all the resources of the laboratory in the diagnosis of syphilis, but the discussion of them has taken practically all the time allotted to me so that I may only mention the Luetin test and Lange's colloidal gold reaction.

The Luetin test was made possible by the success of Noguchi in the artificial cultivation of the spirochæte. It consists in the intradermic injection of an extract of the killed organism. In a normal case these may be slight redness around injection but there is no pain and the erythema disappears within forty-eight hours, leaving no induration. In positive cases a papule forms within forty-eight hours which may go on to pustulation and gradually increases for three or four days, the induration lasting a week. There is also a torpid form of reaction in which the papule formation is delayed and after two days might be mistaken for a negative, but after the third day papule formation proceeds rapidly. The reaction is therefore entirely analogous to the tuberculin reaction and like it is an anaphylactic phenomenon. It develops later in the disease than the Wassermann and is of value chiefly in tertiary and latent cases. It is, however, an indication only that the patient has had syphilis and not necessarily that he still has it. It may be obtained where we have every reason to believe that the disease has been eradicated and does not negative such a belief. It is, however, a valuable aid to diagnosis in many cases when in spite of a negative Wassermann we still suspect the presence of syphilis.

Lange's colloidal gold test depends on the observation now fully confirmed that while normal cerebro-spinal fluid (one-tenth dilution) has no effect on a solution of colloidal gold, a precipitate is formed when pathological fluids are added in certain dilutions. A series of observations are made using varying dilutions of the cerebro-spinal fluid and the results are plotted to form a curve. Three different types of curve may result characteristic of general paresis, syphilis of the central nervous system and of meningitis, and in the case of the first mentioned this curve is so definite that the reaction is of equal if not greater value in the diagnosis of this condition than the Wassermann. In the case of tabes the curve resembles that obtained in cerebro-spinal syphilis.

The methods of examination that I have mentioned form our chief aids in the diagnosis of syphilis in its various stages. With their systematic use it is difficult to conceive of a case of syphilis escaping detection and it is accurate and early diagnosis that forms the basis of our attempts to limit and eradicate this disease.

CARCINOMA OF THE COLON

By E. W. Allin, M.D.

Edmonton

CARCINOMA of the colon demands our attention first because, out of cancer in general, one case in about every ten occurs in the large intestine.

Second, because in a large number of cases of chronic abdominal distress, the surgeon cannot be certain beforehand but that he may meet with this condition on opening the abdomen.

Third, because of a better type of operation, much better results are obtained than previously, and the danger of recurrence and metastases is less than in cancer of almost any other part of the body. Three mistakes were made in the past. First, patients were left until general weakness, or secondary involvement of the surrounding organs, or metastases to the liver, glands, etc., prevented any possible chance of successful operative treatment. Second, many patients were not diagnosed until complete obstruction supervened. Third, our operations were not extensive enough. We did not free the bowel widely and so make it possible to prevent soiling, to join the bowels without tension, or to get beyond the disease in the bowel itself or the neighbouring glands.

Mr. Butin reported that 60 per cent. of cases of cancer of the large bowel died of obstruction, before the glands became involved.

Carcinomata occur more frequently in the large than in the small intestine, and from what we know of the ætiology of cancer, this may be explained as due to the greater mechanical irritation present in the former. In our practice also, we have met with cancer more frequently in the rectum and cæcum than in the other areas of the large intestine.

Three types of cancer are found, i.e., medullary, colloid, and scirrhus; all arising from the gland epithelium and belonging to the general group of cylindrical-cell carcinomata. Of the three the medullary and the colloid types, as a rule, involve a considerable

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area of the bowel, do not tend to obstruct the lumen, but form metastases rather early and rapidly.

In such cases the lesion is not usually recognized until the secondary growths have become so marked and of such serious import that surgical interference is inadvisable or impossible. The greater number of cases of cancer of the large bowel which have come to our attention have been, however, of the scirrhus type. These involve as a rule only a limited portion of the bowel. They are sharply defined with a restricted infiltration. The bowel is usually encircled by a ring-like mass, the base of which is densely fibrous; a condition which tends to constriction of the bowel and produces early symptoms of obstruction.

The fibrous character of the tumour apparently restrains by lymphatic infiltration the formation of secondary masses in the lymph glands. One finds the lymph glands in many of these cases enlarged, but this is not unusually due to infected drainage from the ulcerated area of the bowel. It is the scirrhus type of tumour which we have found to offer the best prognosis through the medium of radical surgical intervention.

The diagnostic features and symptoms are, especially, colicky pain in the abdomen, not usually extreme until the obstruction becomes more and more marked, when it becomes more localized and the patient may himself point to the seat of the trouble. This pain may be the first symptom complained of and may be so severe as to cause reflex vomiting. Constipation may be severe, with intermissions when altered blood, mucus, and pus are seen in the stools; at times there is diarrhœa. The patient becomes cachectic and anæmic and loses weight. On examination one may hear gurgling of the bowel contents passing through the narrowed lumen. The most reliable sign is a tumour palpable either by abdominal or rectal examination. Some tumours are so far under the ribs that it is impossible to feel them. The tumour may be movable and tender and the patient point to it as the place where his distress commences. There may be active peristalsis with distension above the obstruction. Examination by the "sigmoidoscope" is of great assistance in tumours in the rectum and sigmoid region. The *x*-ray should be used in those cases where time can be taken.

In all cases where one suspects cancer of the bowel, a very careful examination should be made of the liver. Several times an examination of the liver has led one to look lower down for the primary focus of the disease.

The condition has to be differentiated from:

1. Any other cause of acute obstruction where this has intervened, such as foreign body (gall stones), hernia, etc.

2. In the more chronic cases, pernicious anæmia, chronic obstruction from bands or adhesions, cancer of the stomach.

Previous to ten years ago, I attempted removal of favourable looking growths of the fixed intestine by a limited resection and by joining the ends of the bowel.

These cases did badly, so much so that I decided at that time to do nothing but a colostomy on future cases.

This gave relief for about six months, after which the patient developed symptoms of the general spread of the cancer with death in from one year to eighteen months in all cases.

I thought there must be a much better way to handle these cases and so made a careful study of the literature, more especially the writings of such men as Moynihan, Lane, Mayo, and Miles—who were warm advocates of the free mobilization of the bowel and wide resection with the establishment of a continuity of the bowel following operation.

Operative procedure. In acute obstruction an attempt should be made by copious enemata to afford relief, so that operation may be done under more favourable conditions a day or two later. If relief cannot be obtained, a colostomy should be done. In cases not acutely obstructed and where the general condition of the patient, after very careful consideration, warrants an attempt at removal of the growth, the general principles of the operation are much the same wherever the growth may be. If in a freely mobile portion, as the transverse colon or sigmoid, the growth can be readily brought out on the surface. If in a fixed position as in the cæcum, ascending colon, hepatic or splenic flexure, the outer leaf of the peritoneum is severed and this allows the drawing inward of the bowel very readily with the growth included. Care should be taken not to injure the ureter. This has the further advantage of carrying any involved glands along with it. In some cases certain ligaments and adventitious bands require section and ligature. In the case of the cæcum, ascending colon, or hepatic flexure the proceding is practically the same, as it is necessary to join the ileum to the transverse colon to get a good result. The terminal eight or ten inches of the ileum is removed along with the cæcum and the colon up to a freely mobile part of the transverse colon, branches of the ileo-cæcal, and right colic arteries are tied well above the disease. The lymphatics for the most part lie close

along the bowel or in the mesentery along the course of the blood vessels. In this manner the tumour is delivered through the abdominal incision, the inner leaf of the peritoneum is cut across from the ileum to the point of section in the transverse colon, warm moist pads are packed into the wound all around to protect from soiling and also to prevent oozing, and to keep coils of the small intestine out of the field of operation. Clamps are applied to the ileum about ten inches from its termination and to the transverse colon. The bowel is cut in two by the cutting blade of the actual cautery and the mass and the liberated bowel removed along with the lymphatics.

I prefer to completely close the cut ends of the bowel and do a lateral anastomosis of the ileum to the transverse colon. This does not take much longer, and I think, on the whole, is much safer for the average surgeon than end to end, or end to side anastomosis, as there is less danger of tension and one can unite the peritoneum to peritoneum.

Peritonization of the denuded surface is made by drawing together with a few stitches the edges of the cut peritoneum. We have had three cases of this kind on whom we thought there was a chance of cure.

Mr. A., a farmer, aged fifty, with an extensive growth of the cæcum with the glands markedly involved. We did the above operation with good immediate results, the man had normal use of his bowels, was able to return to his work for the season, but six months later complained of severe pain down the sciatic nerve, no doubt due to secondary growths, which finally caused his death. The bowel condition, however, was satisfactory throughout.

Another, Mrs. G., was a stout woman who had had chiropractic treatment for one year, was getting worse, and in whom we found a cancer involving cæcum and appendix. We did this operation. She is alive and well to-day four years after the operation, has normal use of her bowels, doing her own work, and is still overweight.

In the transverse colon, the operation is simpler. The glands lie parallel with the bowel and are readily removed with the growth. The gastro-colic omentum is divided for a sufficient distance and the vessels ligatured, and similarly the great omentum. Clamps are applied to the bowel and with sponges liberally placed around, with the actual cautery the bowel severed and the growth removed. In this case I have no objection to an end to end anastomosis, unless the proximal part is much distended, in which case I prefer a lateral, after closing the ends.

In the splenic flexure, the gut is freed in the same way as for the ascending colon and drawn downward and inward to the wound. There is often œdema in the meso-colon, and there may be adhesions to the spleen, pancreas or duodenum. Great care must be taken not to injure these in drawing down the mass. If the patient's condition be good, the mass is resected similarly to the method employed in the transverse colon; but if the patient's condition be not good, a safer plan is to use Mickulicz' method, which means drawing the mass out of the abdomen freely and leaving it there, closing the upper two-thirds of wound in abdomen. Relief can be afforded to obstructive symptoms by suturing a rubber drainage tube into the gut above the tumour. After four or five days the bowel is ligatured close to the abdomen on either side of the tumour and the mass cut away. In ten days, if the patient does well, the septum between the two intestines is clamped with a heavy clamp, which causes necrosis of the septum and leaves a large opening from the proximal to the distal bowel. The opening in the parietes gradually shrinks up after weeks, and may close itself; if it does not a plastic operation can be done.

This is a long drawn out process, but in patients who do not stand operation well, it is much safer than doing a primary resection. It may be done instead of resection in any of the preceding cases as well as in the sigmoid.

Cancer at the recto sigmoid junction. In these the procedure is somewhat different, but the principles of free mobilization obtain as before. In our experience this is the most frequent location for cancer in the colon to occur and often it is of the ring-like schirrus type without much involvement of the glands and with a marked tendency to cause obstruction and possibly the threatened death of the patient. In these cases the Morrison or Balfour is by all means the operation of choice if one decides to attempt any curative operation at all. The patient is placed in the high Trendelenburg position which allows a splendid accessibility, a long incision in the left rectus is made from the pubes to a little above the umbilicus. The loose part of the sigmoid is drawn into the wound and the tumour carefully felt. Its extent and any involvement of the glands or the liver are determined. The peritoneum along either side of the lower sigmoid and upper rectum is divided and the lower ends of the incision in the pouch of Douglas are connected by a transverse incision anterior to the rectum. This allows of easy mobilization of the lower sigmoid and tumour.

The ureters on either side must be identified, especially on the

left and kept out of the way. The superior hæmorrhoidal artery and the middle sacral are ligated, moist swabs packed behind the gut wall of the area exposed; clamps are applied to the gut above and below the growth, and the tumour removed as in the preceding operations. A fairly firm rubber tube three quarter inches in diameter with a lateral opening near its end, is then passed into the lumen of the proximal gut. The gut is united to it by a few sutures and then invaginated still further and a purse string suture passed around and tied closely to the tube. Forceps are then applied to the rectum so as to hold apart its walls. The clamp below being removed, bleeding points are tied, the rubber tube passed into the lumen of the rectum and so out through the anus. As the proximal gut is drawn down to the rectum a few stitches attach the rectum to the rubber tube. The tube is drawn further out so as to invaginate the upper end of the rectum. Several other stitches are then applied uniting the two ends of the gut more firmly.

The divided peritoneum is then stitched to the new rectum along the sides and in front. The rectal tube may be left in for eight or ten days until the catgut sutures are absorbed when it comes away readily. We have found this a very satisfactory operation, better than delivering the mobilized tumour through the wound in the perineum, or through the greatly dilated anus. The shock is severe and all precautions should be taken to prevent it.

Mrs. W. was operated on February 3rd, 1916. She made a splendid recovery and is alive and well in Edmonton to-day, has natural use of the bowels, and is doing her work.

Mr. P. did so well after operation, February 23rd, 1916, that a year later he was accepted for overseas, where he gave his life for his country.

Finally. I cannot emphasize too emphatically the care required in deciding whether a patient should or should not be advised to undergo such radical procedure. I think fully 50 per cent. of the cases as they come present no problem because the disease has become too far advanced; either liver or glands in the abdomen being extensively involved. A goodly number of the remainder come in with acute obstruction, when, unless mild measures overcome the obstruction, nothing but an artificial opening to relieve it should be done. Later, if the patient does well, a radical procedure may be followed.

BOTULISM—A CLINICAL STUDY OF AN OUTBREAK IN THE YUKON

By J. A. R. Glancy, M.D.

St. Michael's Hospital, Toronto

THE term botulismus (from botulus, Latin for sausage) was coined in southern Germany in the beginning of the 19th century as a name for a peculiar type of food poisoning which was caused by the ingestion of spoiled sausages. Although the outbreaks were comparatively frequent, it was not until 1894 that the actual cause was discovered by Van Ermengem who showed that the poison is due to a toxin produced by an anærobic spore-bearing bacillus which he called B. botulinus. The majority of cases on this continent have been described by Dickson, who found that the toxin is not only found in foods containing animal protein, but may be present in vegetables or fruits.

It may be well to point out that in dealing with the outbreak near Dawson, we are considering one which occurred in a comparatively isolated district. There is not in Dawson, or nearer than Vancouver, I believe, a laboratory suitable for experiments of a bacteriological nature such as would be required to establish a definite diagnosis by that method, and furthermore, the police, wishing to take all precaution against any further poisoning, disposed of the remaining portion of the food stuff which was considered to be the source of the poison, and consequently the doctors in charge were not able to send any of it to a laboratory for examination. As the clinical aspect of the case is the one which the majority of us will probably be most interested in, I shall try to stick fairly closely to it.

Report and Investigation. On Thursday, May 22nd, 1919 (accompanied by a superintendent of one of the departments of the mining company to which I was physician), I called at Camp 54 Hunker, about twenty miles from Dawson, and partook of the noon meal along with thirty-four of the men. Seven other men ate later of the noon meal serving, either at table or in lunches, thus exposing to the poison forty-one men in all. Of that number twelve died, eight (including myself), were hospital patients, and

three were only slightly incapacitated for work, making twenty-three affected in all.

I am indebted to Mr. E. E. McCarthy, manager of the Yukon Gold Company, for getting, at my request, much information in regard to the investigation, which, owing to my illness, I was unable to obtain.

A table was compiled to show, as nearly as each man could state, the various articles of diet which he was positively certain he ate at the particular meal in question, namely the noon meal of May 22nd, also in relation to four others who ate of the same serving but as lunches or at a later table. From this it was found that the only article of diet eaten in common by the men was beef. The fact that our investigation in this regard showed that men who did not die and who were not even affected ate the beef, does not throw it out as the causative factor to my mind, because portions of the meat were not cooked to the same degree, a considerable proportion was quite rare, and it seems quite reasonable to me to believe that it was from these rare areas, particularly next the bone, that the toxin came which caused the poisoning.

Account of my own Illness: I left the Camp immediately after lunch and arrived in Dawson about 2.30 that afternoon. I did not notice anything wrong until the next afternoon about 4.30, being twenty-eight hours after the meal at the camp, when I found that there was a certain haziness over my eyes; this condition lasted for about half an hour and passed away. I had dinner at 6.00 p.m. and about half an hour after dinner felt the haziness of vision returning. At 8.30 p.m. I walked the distance of about five good city blocks. I noticed that the haziness of vision was still present to the same degree but that added to this was an uncertainty of step, a feeling that I was stepping high and "walking on air". I attended a dance that evening and noticed that if I remained quiet for long at a time the dimness of vision became greater, whereas while actively on the move I scarcely noticed it. I slept well that night, and at 7.00 the next morning was called to the telephone by the foreman at 54 Hunker. He stated that he was sending in five men from the Camp, that they could not see properly, that they walked as if they were intoxicated, and that one man had been ill in his cabin all night, had vomited a little, and at present was finding great difficulty in talking. I replied that I felt much the same as they apparently, only to a lesser degree. I had difficulty in saying the first couple of words, then I was able to spead in my usual manner. Shortly afterward while going to the manager's home, a distance of about half

a mile, I found that the haziness of vision and unsteadiness of gait were much worse than on the preceding night, and added to this was diplopia, which came on for a couple of minutes at varying intervals. I saw one man at his home and four at the Company's office. Of those seen at the office I sent three to the hospital, the fourth desiring to go to his own home. Realizing that I was getting weaker very rapidly, I called for a car and was taken to the hospital as a patient about three o'clock that afternoon (Saturday, May 24th). I immediately turned my work over to Drs. Culbertson and LaChapelle, who took charge of these cases and those which came in subsequently.

On entering the hospital my pulse was 73 and temperature 98·4°. Every symptom so far mentioned seemed to be increasing in severity and along with this, extreme muscular weakness. Constipation was marked from the onset. I went to bed at once upon admittance, rested well and noticed no new symptoms that day. The following day (Sunday), I noticed that my eyelids were drooping slightly, my pupils were dilated and diplopia was more marked. Was very restless, and perspired a great deal Sunday night and on into the early hours of Monday. I began at this time to have some difficulty in swallowing. By Tuesday my throat, particularly the right side of the soft palate, pharynx, and uvula, seemed paralyzed. I could scarcely swallow at all and my voice was reduced to a whisper. My throat became clogged with a thick, glairy, tenacious mucous which I had great difficulty in expelling. My tongue was becoming thick posteriorly at this time. The weakness of my muscles in general was becoming such that I found it an effort to move my limbs in bed. I noticed that my right arm was weaker than my left, though normally it is the reverse. In the following couple of days the above mentioned symptoms all became more severe, it was almost impossible to raise my right hand to my head, I could get my left there with much less difficulty. The extensor muscles of my fore-arm and hand were particularly affected, also the supinators and pronators of the hand, the flexors were not affected proportionately. Of the fingers the middle and ring fingers were affected most, I am referring here to the right hand and arm. The left side was weak, but the muscles affected were not marked off so distinctly in groups. My tongue now had a thick grayish-black coating and my breath was very bad. Any difficulty I had had up to this time in relation to breathing seemed to be a result of the mucous, now, there was added to this, extreme muscular weakness and a paralysis, I believe, of the respiratory mechanism. I could see no

expansion of the ches at all and it seemed like a leaden weight. It was at this time in my illness that I had a period of about twelve hours in which my condition, from a respiratory standpoint at least, was considered the worst. My pulse was of very small volume but regular in rhythm, the rate varied from 88 to 100, my usual rate being 80. My temperature remained normal throughout this bad spell. Following this I perspired freely and was able to breathe more easily. About twelve hours later I had a similar attack but not quite as severe, the whole condition of general weakness, excessive mucous in the throat, difficult breathing and weakened heart prevailed as in the former one, however. The only other new symptom following this, up to the time that I noticed an improvement in my condition, was a severe left sided headache. Although there had been periods which were not as distressing as others yet I believe the first real step toward recovery occurred on June 8th, approximately two weeks from date of admittance, when I found that the left side of my throat (which was only slightly affected at the most) felt almost normal. There was a trifle less mucous forming and it was not as thick and tenacious, while swallowing became a little easier. I was able also, for the first time, to walk to the foot of the bed, holding on to the side. My legs were not affected to the the same extent as my arms by any means, but they were very weak also. No symptoms mentioned previously had entirely disappeared up to this time. On June 9th, I sat up in a chair for half an hour. Any nourishment which I had had up to the present had been in the form of broths, tomato soup, whites of eggs, milk, brandy, champagne and brandy-saline enemata. I now began to add a little more to my dietary and to exert myself just a little more each day. On June 11th (18th day in hospital), a dull pain came on in the aortic and pulmonary areas, this continued present to the same degree until June 22nd, which was the first time that I got a really noticeable expansion of my chest, until now my breathing had been all abdominal and that limited. Up to this time I had lost twenty pounds. From this time on there was a very gradual improvement in every way, and I left the hospital on July 5th to recuperate at a friend's home. By the last of July the pain in the pulmonary and aortic areas had practically gone, I still had some ptosis and lack of expression, was also very easily tired and required to walk with a cane all the time. I left Dawson for Toronto on August 15th going by the Western and Southern States. While in San Francisco Dr. Dickson made a careful examination, September 19th, 1919, and summarized his findings in this way.

"Skin moist, pupils react to light and accommodation, no ptosis; tongue normal appearance, pharyngeal reflex intact, mouth not dry; pulse, 96, regular, rapid variation to slight exercise, low tension blood pressure 100 and 75 (Mercer) confirmed. Chest movements equal, expansion $28\frac{1}{2}$—$31\frac{1}{2}$, lung clear; heart, impulse weak, dulness to left 4 inches from mid-sternal line, not enlarged to right; sounds, 1st, poor muscular quality, no murmur, 2nd, not accentuated. At base, aortic less intense than normal. Skeletal reflexes, normal."

Since that time I have been improving gradually in every way. When I get tired, which is fairly easily, I notice a haziness over the eyes for a moment at irregular intervals, this has been getting less frequent even under tired conditions. The strength of my arms seems to have come back completely, am still short of breath on exertion but only to a slight extent as compared to a month ago. (January 1st, 1920.)

Examination by Dr. Julian Loudon of Toronto on April 1st, 1920, showed:

No symptoms. There is a slight tremour of the hands and briskness of the tendon reflexes. The heart is normal in size and the sounds are clear. Pulse rate is 96 sitting, 100 standing, and 108 after touching the toes ten times. S. B. P. 110, D. B. P. 70.

I had regained, by April 1st, 1920, all but four pounds of the twenty which I had lost

History of Fatal Cases. (Personal and from St. Mary's Hospital Reports.)

1. A. B., age forty-four, admitted at 10 a.m., May 24th, 1919, temperature 97°, pulse rate 80. He complained of great pain in the back of his head, was unable to talk and had great difficulty in swallowing. Vomitus, the result of an emetic given, was thick and dark. At 3 p.m. his pulse was 104 and quite thready, temperature 96°. In spite of cardiac and respiratory stimulants patient continued to get weaker and died at 4 p.m.

2. J. G., age sixty-three, admitted at 8 p.m. May 24th. I saw patient in the morning. He stated at the time that he felt as if he were intoxicated, his tongue was a little thick and hence his speech indistinct. He was becoming worse rapidly and shortly after getting to the hospital became very restless, his tongue was dry and thick, he could not swallow even fluids and a condition of general weakness prevailed. During the night his restlessness increased and he complained of a pain in the head and tightness in the chest. He died May 25th, in a condition of sudden collapse but

fully conscious to the last. Patient's temperature taken q. 3 h. varied from 96° to 98° throughout the course of his illness. His pulse, practically normal on admission, became very gradually more rapid and of less volume, but not sufficient to consider that a serious condition were present if one were judging from the pulse alone, rate near death was 104.

3. J. McN., age fifty-three, admitted at 8 p.m. May 24th. When admitted patient had a tottering gait, difficult vision, was unable to swallow and his speech was impaired. These symptoms became more severe, his right arm became paralysed and a feeling of suffocation prevailed. His temperature near death was 97·3° and pulse 76. Died at 10.15 a.m., May 26th.

4. J. T., age forty-nine, admitted at 10 a.m., May 24th. Appeared very ill—symptoms much the same as in the preceeding cases, pulse 64 and temperature 97°. Patient complained of arms being numb. Fluids were given until patient became unable to swallow when nutrient enemata were started. At 12 noon May 26th, pulse was 92 and temperature 96·2°. Died at 1. 30 p.m.

5. A. B., Age thirty-seven, admitted at 6.30 p.m., May 24th. Patient had been quite sick at his home on the preceding evening, was very weak and scarcely able to talk. Twelve hours after admission he was unable to swallow even fluids. He had three weak spells at intervals of two hours before death. Pulse was 100 and temperature 96·6° at 4 a.m. Death took place at 4.40 a.m., May 26th.

6. W. L., age thirty-nine, admitted at 7 p.m. May 24th. Pulse 45 and temperature 97·6°. On the afternoon of May 23rd patient vomited several times. By evening he could not walk well and his vision was somewhat impaired. He remained in bed until the next morning—attempted to get up and walk about but was dizzy and weaker than before. Aside from a little difficulty in speech and slight diplopia patient seemed all right as long as he remained in bed. His condition became worse that afternoon—all symptoms increasing rapidly—he vomited several times on the way to the hospital that evening. Patient complained of great tightness of the chest that night—examination showed the lungs clear. This condition became more marked becoming one of suffocation—he died May 27th.

7. A. G., age thirty-nine, admitted 10 a.m. May 24th. Saw patient at 8 a.m. when his only complaint was a haziness over the eyes. On entering the hospital be began to have slight diplopia—he had no muscular weakness and laughed at the idea of going to

bed. On May 26th his general condition was not as good—he had a slight impairment of speech and was a little restless. He began to get weaker rapidly and died 11.45 May 27th. Mr. G. had a great deal of pain in his head an hour before death. At 8 p.m. his pulse was 99 and temperature 97°.

8. A. C., age forty-nine, admitted 7 p.m. May 24th. Pulse 67 and temperature 98°. Complained of haziness and a certain amount of diplopia but otherwise felt well. He took a bath without any assistance and went to bed. The following day he felt better as far as the preceding symptoms were concerned but this did not last very long as that evening he began to get weaker—his arms became numb and he had a great deal of pain along the whole extent of the spinal cord. At 2 p.m. May 28th his pulse was 62 and temperature 96°. He died at 2.35 p.m. of the same day.

9. F. McD., age sixty-two, admitted at 7 p.m. May 24th. Pulse 62 and temperature 97·6°. Complained only of slight diplopia and headache—took a bath without assistance and walked down the hall to his room in the best of spirits. In a couple of days he developed the common symptoms of difficulty in swallowing and in speech. The chief thing of which he complained was very severe pain in the head. He perspired very freely for the first few days of his illness. His pulse varied from 70 to 108 while the temperature remained at about 98° most of the time. Just before death his pulse jumped to 140 and temperature was 97°—died May 30th.

10. O. N., age forty-four, admitted 9 a.m. May 25th. Pulse 58, temperature 97°·4. Condition not regarded as serious. Had a little nausea but no difficulty in speech or in swallowing. On the evening of the 27th, however, he complained of soreness of the throat and some difficulty in swallowing Following this he complained of severe pains in the occipital region and along the whole extent of the spinal cord. His condition became rapidly worse and he became very restless as death approached which was at 10.30 p.m. on May 31st.

11. W. M., patient had some impairment of speech but had indulged freely in liquor as soon as he believed he had been poisoned, thinking it would be beneficial. A definite diagnosis was not made for some time as a result of his indulgence, but the same treatment as the others had received was given him. He did not rally to any degree but rapidly got worse. Artificial respiration was resorted to, but to no avail—he died after a very restless period in which the chief difficulty seemed to be respiratory. Died at 10.15 a.m. June 5th.

12. A. Z., admitted at 7 p.m. May 27th. Pulse 80 and temperature 97·4°. Patient's speech was impaired and he had difficulty in swallowing when admitted. Respiratory difficulty soon followed and patient died at 4.20 a.m. June 2nd. This is the only case where catheterization was required and that only after May 30th. His average pulse was 88 and temperature 98°; immediately before death his pulse was 130.

Autopsy. An autopsy was performed on two cases by Dr. W. E. Thompson of Dawson. The pathological conditions present were, in the first, that the pancreas and the under surface of the liver were darker than normal and that the mucous membrane of the stomach showed some congestion. The right auricle contained a large quantity of clotted blood.

In the second, the mucous membrane of the stomach and the lower lobes of the right lung were congested.

Pathological Report. Drs. Robinson and Lougheed, of Toronto University, who examined the specimens sent, stated that there was considerable post-morten degeneration but that, (a) The lungs showed marked œdema and congestion, and thrombosis of the fine capillaries; (b) the liver marked passive congestion with some thrombosis in the smaller vessels; (c) the spleen thrombosed vessels and an interstitial chronic splenitis.

Unfortunately no specimen of the brain was sent.

Cases Which Recovered.

1. O. C., age twenty-five, ate noon meal at Yukon Gold Camp May 22nd. Vomited half an hour after the meal. Patient felt a little weak on morning of May 24th—went home from work at 2.30 p.m.—his vision was a little blurred at this time Admitted to hospital at 7.00 that evening. The next day he felt dizzy but no other new symptoms had developed. On May 26th his tongue was becoming dry, hard and rough, while a white fur was forming on the dorsum of the tongue and the tongue was becoming thickened posteriorly. He had also some ptosis of the right eye and slight difficulty in swallowing. Patient did not have much strength in his arms—the right was the weaker—this came on shortly after coming to the hospital. He was easily fatigued by slight effort. He was able to talk fairly well throughout. The symptoms *re* tongue, swallowing, etc., remained about the same for two weeks after coming on. He had a fluid diet for five days—then soft diet—and at the end of 10 days was able to eat any article of diet desired. The extensor muscles of the forearms and hands were weakest—the right the weaker of the two. He had no pain

in any way nor was his chest affected to any extent. There were a few particularly good days in which he thought he was making rapid strides toward recovery but he would go back almost to his former condition for a day or two—not so far back, however, as before, so that improvement was very gradual. Patient lost 12 pounds during his illness. He noticed no improvement in the strength of his right arm until about June 25th. In a letter from Mr. C. dated January 26th, 1920, he stated that his arms had not regained their former strength entirely but were getting stronger gradually. He found that the good and bad periods continued as during the earlier part of his illness but as the good periods were so long as compared to the slight backward tendency he considered he had practically returned to normal. He had regained his normal weight by December, 1919.

2. C. T., age thirty-one. Was on the night shift—had the 6 p.m. meal of May 22nd. Stated that on May 24th his stomach felt "like a stone" while the following evening his vision became blurred. He entered the hospital on May 29th. Following a purgative the heavy sensation in the stomach went away His tongue now became hard, dry, rough, white, and thick, and he expelled a thick glairy mucous which came from the naso-pharynx. His eyes became glassy in appearance and ptosis (right chiefly) occurred. He found it hard to lift his head from the pillow. He had pain in the lower right occipital region and in the back of the neck on the same side. His right arm was weaker than his left. His right leg was also weaker than his left but not as noticeably so as in the arms. He remained in bed for only three days altogether—all of the above symptoms were present within three days of admission. Patient's throat was very dry at night but by working his tongue about he could get some secretion. Diplopia was slight. His vision was much better for long than short distances. He had some tightness across the chest, but this was of short duration and gave him no particular respiratory difficulty. He lost sixteen pounds in one month from date of admission—his normal weight was one hundred and sixty. Eye and throat symptoms and headache were the worst symptoms in this case. He left the hospital June 30th.

In a letter from him dated January 2nd, 1920, he states, that as far as he can see he has no permanent after-effects. He had been working at his former work for three months.

3. E. W., age thirty-eight. Had noon meal of May 22nd. On May 27th patient had haze before his eyes, was dizzy and nauseated,

had diplopia at times also. Went to work as usual but was very weak and stumbled about as if intoxicated. That afternoon he felt as if there were a band about his throat and chest—his tongue became dry and stiff and he spoke with great difficulty. If he wakened in the night he found his throat quite dry. Had a choking sensation in swallowing—seemed to be a constriction in throat immediately behind larynx. There was a bad taste in his mouth most of the time. Weakness of the muscles of the back of the neck and shoulder blades came on a few days after the above symptoms had appeared. Lameness in the calf muscles and extensors of the thigh began one week after the first symptoms came on. His arms were weak from the first—the right the weaker of the two. He limped because of a difference in the strength of the two legs. Patient states he had "pins and needles" effect a great deal of the time *re* the ring finger of his right hand. May 30th he began to have a slight cough and expectorated a slimy sort of mucous material. The muscles of the forearms were particularly weak. Diplopia which came early remained for a week and a half after coming to the hospital. Patient did not go to bed at all and swallowed almost every article of food even if he had to wash every bit down with water. His loss o' weight was twenty-four pounds. He was constipated from the onset of the disease. Throughout his illness he would have a few good days and then go back almost to his former condition again. Left the hospital on June 30th feeling much stronger. In a letter dated December 22nd, 1919, he states that the bad taste in his mouth left about the middle of September, and he then improved rapidly. He has regained his old weight, works at fairly heavy work, and has no permanent after effects.

4. E. L., age thirty-six. Ate noon meal at camp. On the afternoon of May 25th, patient had frontal headache, blurred vision, a feeling of vertigo, and pains in the calf muscles of his legs. About three days later he found that he was getting noticeably weaker and on May 30th quit work. While coming to Dawson he states he had a slight chill and considerable pain along the spinal cord. Pain was particularly severe also in the mastoid regions. Although able to get around for the next few days yet he felt himself getting still weaker and began to have a very unsteady gait. Upon noticing that his tongue was becoming thick and his speech indistinct he went to the hospital June 13th. Ptosis in the left eye came on shortly before entering the hospital. His sclerotics were of a light yellow, glassy appearance. Both arms

were weak—the extensor muscles of the forearms being affected to a greater degree. His throat was very dry and his tongue coated. Obstinate constipation was present throughout. He had no diplopia at any time but things looked larger than usual. A thick glairy mucous secretion came from the naso-pharynx. Although every symptom mentioned above increased for a week or so, by July 1st there was a marked change—he was improving in every respect. This was not as bad a case as the majority. He left the hospital shortly after July 1st. Patient lost twenty-four pounds during his illness.

5. A. B., age forty-three. When patient arose at 5.30 on morning of May 23rd he seemed blind for a couple of minutes. After rubbing his eyes strenuously he was able to see, but his vision remained blurred. The next day he noticed himself becoming tired on the least exertion—he had a soreness along the costal margin and his arms and legs were stiff at the elbows and knees respectively. He entered the hospital on the evening of May 25th. At this time he had added to the above a severe frontal and parietal (one sided) headache. He complained of a smothering sensation which he states was entirely relieved by a laxative. His stool was very dark and had a very bad odor. The stiffness of his elbows and knees became one of weakness only, following intestinal relief. According to patient his right leg and left arm were weaker—his forearm and hand being the weakest part comparatively. By this time (May 26th) his tongue had become quite heavily coated, thick at the back, dry, and he had a thick mucous secretion as in the other cases, but swallowing had been only slightly impaired. Patient left hospital on June 19th feeling that although he had some symptoms left he was not ill and could get along nicely at home. However, while at home he had considerable pain along the whole spine particularly in the lumbar and interscapular region, also had some difficulty in breathing. He returned to the hospital on June 14th. Improvement was fairly rapid and he left the hospital the last of June. His loss of weight was six pounds.

6. H. A., age sixty-one. Patient ate a lunch prepared for him, thus he did not eat along with the rest of the men at the noon meal. He had the evening meal half an hour after the day men had eaten. On May 24th diarrhœa came on, his vision became blurred, and he had an occipital headache. The next day no new symptoms developed though he felt a little weaker. The following day he noticed some difficulty in swallowing—the obstruction seeming to be directly behind the larynx. His tongue

had become quite thick at the back, hard, dry, and coated, while his throat was very dry also. Haziness of vision and dizziness became marked, while his arms—the right in particular—became quite weak. The forearms and hands were affected to the greatest degree. The secretion from the throat was typical with that described in the other cases. His pupils were dilated and his sclerotics glassy in appearance. On May 30th he came to the hospital—all of the above symptoms increased in severity for about a week and then his condition began to improve. During the first week in the hospital ptosis came on—the right eye being worse in this regard. He had also some difficulty in breathing and complained of a dull pain (continuous) in subscapular regions. His loss of weight during whole illness was twenty-three pounds. By June 14th improvement became more noticeable. Patient stated the first difference was in his eyes—his vision being less blurred. Swallowing then became less difficult and the strength returned gradually to his arms. Patient would have a period of two or three good days then go back almost to his former condition then up again a little farther and so on until he noticed a marked improvement. A letter dated December 27th, 1919, states that he left the hospital August 1st, but was unable to do his former work until November 1st. He had, at time of writing, some shortness of breath on exertion and stated he had not yet regained his former weight. His improvement had been steady and he feels certain he will have no permanent after effects.

7. G. C., age fifty-one. Had noon meal with the rest of the men. On May 25th he was dizzy, had blurred vision and felt as if he were intoxicated, but did not stagger. By the next day some diplopia was present. By May 27th he noticed a weakness in his throat and his speech was rather thick. He thought this was the return of a catarrhal condition. Patient had also some weakness in his right hip which affected his gait and his right hand was very weak. The next day he was not able to raise his right hand above his head. His throat, the right side particularly, seemed to be paralyzed to an extent. His tongue was thick and he had some difficulty in swallowing. He did not come to the hospital until May 29th, when he felt he was growing generally weaker. Eye symptoms were increasing in severity and ptosis was added to those already present. The ptosis was greater in the right eye. His tongue was very dry, his breath bad and he had a bad taste in his mouth. Patient was constipated from the beginning. As seen from the above, the right side of his body was affected to the

greater degree. He had no particular difficulty in breathing at any time. The blurred vision disappeared by degrees and ptosis was practically gone by August 11th. Had fluid diet for some time which he took with some difficulty—difficulty in swallowing was marked in this case for a few days. He lost twenty-one pounds during his illness. As in the other cases he had good and bad periods in a somewhat regular fashion. His pulse, temperature or respiratory rate were not affected to any degree. In a letter dated January 15th, 1920, he stated that he left the hospital on August 28th and went to live with a friend during convalescence—that he is as active as ever and that he weighs three pounds more than he ever did. As far as he knows there are no permanent after effects.

Treatment. A purgative (castor oil or magnesium sulphate) was given as soon as the case was seen in practically every instance; an enema was usually given after this whether the purgative was effectual or not. An emetic was given in the majority of cases also, while gastric lavage was used in one or two instances but with rather unsatisfactory results. Following this a stimulatory type of treatment was begun. This consisted of strychnine, grains 1-30 every three hours, nitro-glycerine compound (in a few cases) and a brandy-saline enema (one part of brandy to four of saline) every four hours. Interstitial salines were given—also camphor and ether per hypo. In at least one case artificial respiration was tried and in another oxygen inhalations, but neither seemed of any permanent benefit. Patients were given liquid diet in the majority of cases—all the severe ones could not take that even, and nutrient enemata were given frequently. In those cases where the patient could swallow fluids, he was given broths, whites of eggs, milk, brandy and champagne. In the less serious cases he was allowed to eat almost anything he found he could swallow without too great difficulty.

Symptoms. To summarize. The following are the chief symptoms of the disease, in the order in which they occurred in the majority of cases—and absolutely as they occurred in my own case:

1. Blurred vision—seemed just like a haze over the eyes.
2. Unsteadiness of gait—tottering in character.
3. Diplopia and dilation of the pupils.
4. Absolute constipation present from the onset.
5. Extreme muscular weakness and a eelin ; of pins and needles in the affected fingers at the tips.

6. Perspiration and restlessness during the first few nights of the severe period.

7. Ptosis and glassy appearance of the sclera.

8. Tongue thick at back and covered with a greyish black or thick dirty white appearing coating.

9. Lack of salivary secretion.

10. Difficulty in speech—fairly strong and thick, then becoming a thick lisping whisper.

11. Right side of soft palate, pharynx, and uvula seemed paralyzed.

12. Difficulty in swallowing

13. Thick, glairy, dark, tenacious, foul-smelling mucous in throat and naso-pharynx, which was very hard to expel.

14. Inability to expand chest—feeling of suffocation.

15. Severe left-sided headache—later in course of illness.

16. Pain in pulmonary and aortic areas (not common to all).

17. Pain along whole extent of spine—cervical region most intense.

18. Loss of weight.

19. Normal temperature with a regular pulse in both rate and rhythm (though of low pressure and poor volume) except at the particularly bad periods.

20. Absolute clearness of mentality of each patient throughout the whole illness.

In only three cases was there vomiting and in one diarrhœa as an apparent direct result of the poison—hence these cannot be considered as symptoms in common.

From the Histories of the Preceding Cases, Note:

1. That the length of time before symptoms manifested themselves varied from twenty-six hours to five days—those who died being from twenty-six to thirty hours, which was the time in the majority of all cases, and those who lived being from twenty-six to seventy-two hours—with one exception which was five days.

2. That it was the right side throughout, which was affected to the greater extent in almost every case. The forearms were affected to the greater extent—the left in a general way—the right in distinct muscle groups—the weakness of the extensors of the forearm and hand being common to almost every case.

3. That there were no griping pains in the abdomen and that vomiting and diarrhœa were not common symptoms.

4. That there was little deviation from normal in either

temperature or pulse rate except where patient was approaching death—and then only immediately before death.

5. Somewhat regular irregularity as to good and bad periods—particularly during convalescent period. This was common to all.

6. That both the intrinsic and extrinsic eye muscles were affected in practically every case.

7. Every man (including those who died)—had perfect control of mentality at all times.

8. Wherever a headache has been mentioned, it will be noted that it was usually occipital—if parietal it was usually left-sided.

9. Of those who survived mine was the only case in which there was extreme difficulty in breathing and where the feeling of suffocation was so extreme for so long a period—also where there was intense pain over the aortic and pulmonary areas at the base of the hear .

Conclusion

1. From the available data it seems probable that the poisoning was caused by the ingestion of cold storage beef.

2. The symptoms of the poisoning were typical of those caused by the toxin of B. botulinus.

3. In the fatal cases death was due to respiratory failure.

4. Seven patients died within six days and the remaining five within eleven days after eating the poisonous food.

5. Recovery was apparently complete in all who survived. There were no persisting symptoms or signs eight months after the poisoning.

Editorial

A NEW VIEW OF THE INDUCTION OF IMMUNITY IN THE ENTERIC DISEASES

IN recent numbers of the *British Medical Journal* (August 28th and September 11th, 1920) will be found abstracts from the *Annales de l'Institut Pasteur* of last year giving us the results of recent experimental investigations by Besredka of the Pasteur Institute on the mechanism of infection in typhoid and dysenteric infections. The conclusions arrived at are of great practical importance and are, to some extent, subversive of the views hitherto held.

It has been generally accepted that the specific antibodies found in the blood in infectious diseases are not only evidence of the operation of a defensive mechanism but are themselves an important defense against invasion and it has been thought that the powers of resistance of an individual can be measured by the strength or quantity of these substances in the blood serum. Nevertheless, it has also been recognized that the body must have other means of resistance than can be expressed in terms of this humoral pathology; and that local as well as general immunity is an important factor in the resistance offered by the body to invading organisms.

The recently published work of Besredka would certainly indicate that in the case of infection by the enteric and dysenteric groups the infection is primarily local and that septicæmia is a secondary phenomenon. The defensive mechanisms also appear to be essentially local, while the production of antibodies in the blood is to be regarded as quite a subsidiary occurrence, not in any way essential to a successful resistance against systemic invasion. The great

obstacle, that previous investigators of these enteric diseases met with, was the impossibility of reproducing experimentally in animals a diseased condition closely resembling the natural infection in men. While pathological conditions with some of the symptoms met with in man could be induced by the injection of the pathogenic organisms, no matter how the usual laboratory animals were prepared beforehand, complete clinical and pathological pictures were never reproduced, except in a few cases in which Metchnikoff succeeded in causing typhoid fever in chimpanzees. Besredka, however, found that the previous administration of ox-bile, though innocuous in itself, so sensitizes the intestinal mucosa that when living cultures of typhoid, paratyphoid or dysentery bacilli are administered orally a typical diseased state similar to that in the human is produced. If administered intravenously, intramuscularly, or subcutaneously the diseased process still becomes localized in the intestine. No matter what the method of introduction into the system may be, the sensitized animal always responds by lesions only in the intestine. The other organs, with the possible exception of the gall bladder, are always found free. Besredka also noted that animals which had thus been given the disease and had recovered were solidly protected against subsequent infection, and this in spite of the fact that their serum might show no antibodies nor protective substances of any nature. During the war epidemics of bacillary dysentery were prevalent in all the armies. Vaccination was tried, but was soon given up by all because the results obtained were severe, and out of proportion to any benefit derived. The oral administration of killed cultures, though innocuous did not appear to hold out any promise, because no reaction was produced and no antibodies appeared in the blood serum. Besredka has now shown that in the case of dysentery, especially if some method of intestinal sensitization is induced, as by the previous administration of ox bile, the ingestion by the mouth of killed cultures does set up a complete protection

against future infection, though no signs of immunity are apparent in the blood serum. The same thing applies to typhoid and paratyphoid infections.

It would seem from these experiments of Besredka that oral vaccination of the micro-organism, provided the recipient is suitably prepared, is productive of a much stronger immunity than is afforded by the subcutaneous inoculation and is less likely to produce a general reaction. The final testing of the value of these results obtained in the laboratory must be left to the clinician, but if they prove successful, epidemics of typhoid, dysentery and cholera will be robbed of their terrors. The papers in which the experiments are described are well worth reading in their entirety.

One other point is interesting, that is, the specific relations which pathogenic micro-organisms appear to have to specific tissues and that, as Besredka's work seems to indicate, the resulting immunity is not a general cell action, and carried on in the blood and body fluids, but depends upon the tissues involved and takes place in them.

If these investigations are confirmed and enlarged they would be important in an explanation of the phenomena of specific expressions of infectious diseases, which the ideas of Vaughan, who attributes bacterial disease almost entirely to an intoxication through non-specific splitting of bacterial protein molecules by cell ferments, does not furnish.

MODERN VIEWS ON THE CARE OF INFECTIOUS DISEASES

FEW departments in the whole range of the medical sciences have shown such fundamental and revolutionary changes since the beginning of the present century as that of the so-called infectious diseases. The whole principles of the care of persons suffering from infectious disease have been changed, our ideas of methods of conveyance, of quarantine, of isolation, and of disinfection have been totally altered. Hos-

pitals built ten years ago for the care of infectious cases have become obsolete and require complete rearrangement.

It is strongly recommended to anyone who has not kept in touch with these recent changes to read carefully the report of the Commission of the American Public Health Association as published by the United States Government in their Public Health Reports for October, 1917. This is perhaps the most authoritative recent statement on the subject. Here we find the time honoured process of fumigation defined merely as a method of destroying insects and vermin, the directions for disinfection after scarlet fever and diphtheria include only thorough airing and cleansing of the premises, and many other equally striking innovations.

Or even better, we would recommend a visit to any modern isolation hospital in the larger cities, where one usually finds the use of the so-called disinfectants and antiseptics has been totally discontinued, and patients suffering from various acute infections are treated in adjoining rooms or even in the same ward by the same staff of nurses and medical attendants, and often visitors allowed, and yet cross-infections are reduced to a minimum unknown in the former days of strict quarantine and isolation.

Not only has the new system facilitated the care of infectious cases and rendered their illness and convalescence more endurable, but it promises to aid materially in the eventual eradication of these diseases.

It may be worth while to review briefly the principles which have led to these astonishing changes.

Firstly, it has been recognized that certain diseases are conveyed wholly or partly by insects, and hence the essential point is the exclusion of the insect carrier, which is the only measure required in certain diseases such as typhus, and yellow fever, and a valuable assistant in other diseases such as typhoid fever.

Secondly, that asepsis is more successful than antisepsis, that thorough cleansing by soap and water and ex-

posure to sunlight is more effectual than the use of any gaseous or liquid disinfectant. It is curious that the principles of asepsis should have been early adopted in all surgical technique and yet that physicians should have clung to antiseptics and germicides for decades longer.

Thirdly, and most important of all, contact infection has come to be regarded as the real and practically sole danger in the vast majority of diseases, and following the teaching of Grancher, of Paris, a technique of aseptic nursing has been evolved by which everything coming in actual contact with a patient is sterilized, but all other irksome restrictions are removed. It is by the careful elaboration of this technique with the provision of suitable facilities, such as abundant running water, that one is enabled to treat several different diseases in the same ward.

Again, it has been recognized that in many diseases the chief danger lies not in the primary infection but in the secondary infection by other organisms; this was especially noticeable in the great influenza epidemic but is found true in measles, whooping-cough, scarlet fever and many other diseases, emphasizing the need of a technique which will prevent the conveyance of such secondary infections in a ward as well as the primary disease.

The principle that certain persons remain carriers of virulent germs for long periods after recovery from the original infection has been gradually extended to include all diseases in which we are familiar with the infecting organisms, and probably applies equally to those diseases where the organism is unknown; in certain diseases such as meningitis it is probable the number of carriers greatly exceeds the number of cases where the disease is clinically manifested.

There are still many modern hospitals where the principles of the aseptic nursing of medical cases are not fully taught to the nurses; where months are spent in acquiring an elaborate operating room technique and yet no time given to the teaching of the essential principles of so caring for infectious cases

that the infection should not be conveyed to others. However, the example of the leading contagious hospital is being gradually adopted, and when a rational system for the care of infectious cases is fully taught to nurses and students we shall have gone far towards the stamping out of infectious diseases.

RADIUM FOR THE STATE OF NEW YORK

AN appropriation has just been made by the State of New York for the purchase of 2¼ grams of radium for the treatment of cancer at the State institute for the study of malignant disease at Buffalo. In a statement upon the stewardship of this trust recently made to the American Society for the Control of Cancer by Dr. Harvey Gaylord, Director of the Institute, it was announced that treatment can be obtained there after October 15th gratuitously, by any citizen of the United States, preference being given to citizens of New York. The first gram of radium is already in the vaults of the Institute, and special appliances for its use are in course of construction and a competent physicist has been engaged.

The value of radium has now been tested for several years by many reliable institutions. Researches upon it at the Harvard Cancer Commission, the Buffalo Institute, the New York Memorial Hospital and other centres have done much to define and delimit its value and application. It is now to be taken as proved that it is of considerable value in certain forms of cancer, and that while surgery remains our chief reliance in this disease, radium in combination with surgery undoubtedly increases the prospective cure. The method applied in the last two years of using the emanations instead of radium itself has further greatly increased its range of usefulness. One gram is the minimum available for this.

The statement further points out that the employment of radium for treatment in a State Institute is also of indirect

value in that its use here under scientific conditions will increase the knowledge of the earlier stages of cancer by extending the field of research; and that it will tend to the closer control of early cases, for the fact that it presents an alternative to surgical interference will lessen the reluctance of the public to seek the physician's aid when symptoms first appear and while the disease is still remediable.

THE second International Congress of Comparative Pathology is announced to take place at Rome in the spring of 1921. The co-operation of all who are interested is desired and it is requested that names of those persons throughout the British Empire who are willing to aid in the work of the congress be immediately sent in. Contributions are invited to the programme, and titles and abstracts of papers will be received by the Secretary General to December 15th, 1920. All communications should be addressed to: Professor Mario Levi Della Vida, Secretary General of Committee of Organization, 58 Via Paleruno, Rome, or to Professor George H. F. Nuttall, Sc.D., F.R.S., Longfield, Madingley Road, Cambridge, England.

The Association

CANADIAN MEDICAL ASSOCIATION—CONSTITUTION AND BY-LAWS AS ADOPTED AT THE VANCOUVER MEETING, JUNE 22ND TO 25TH, 1920

CONSTITUTION

ARTICLE I.—TITLE

This society shall be known as the Canadian Medical Association.

ARTICLE II.—OBJECTS

The objects for which the Association is established are the promotion of the medical and allied sciences, and the maintenance of the honour and the interests of the medical profession by the aid of all or any of the following:

(*a*) Periodical meetings of the members of the Association in different parts of Canada.

(*b*) The publication of a periodical journal which shall be the official organ of the Association.

(*c*) The occasional publication of transactions or other contributions to science.

(*d*) Grants of sums of money, out of the funds of the Association, for the promotion of the medical and allied sciences in such manner as may from time to time be determined.

(*e*) Co-operation with and assisting in the development of Provincial Associations.

(*f*) And such other lawful things as are incidental or conducive to the attainment of the objects of the Association.

ARTICLE III.—CODE OF ETHICS

The Code of Ethics of the Association shall be such as may be adopted by the Association from time to time. An official copy shall be kept in the possession of the secretary and shall be open to inspection at all times. A copy shall be supplied to all members of the Association.

Article IV.—Membership

The Association shall be composed of ordinary, associate and honorary members.

Ordinary members shall be (*a*) regularly qualified medical practitioners in Canada who do not profess to practice exclusively any system of medicine; (*b*) members of the Army and Navy Permanent Medical Services in Canada, and (*c*) graduates in medicine engaged in teaching and research.

Associate members shall be regularly qualified medical practitioners and other scientific men of good standing residing outside of Canada.

Honorary members shall be persons who have distinguished themselves and have risen to eminence in medicine or the allied sciences.

Article V.—Branch Associations

The Provincial Association in each province may, by special resolution of such Association, become a branch of the Canadian Medical Association by subscribing to its Constitution, By-laws and Code of Ethics, and by securing the approval of the Council. They shall submit a copy of their Constitution and By-laws and such amendments as may be made from time to time.

Article VI.—Affiliated Societies or Associations

Any Federal Medical or Scientific Body may become affiliated with the Canadian Medical Association by securing the approval of the Council. They shall submit a copy of their Constitution and By-laws and such amendments as may be made from time to time.

Article VII.—Meetings

The meetings of the Association shall be held annually at such time and place as may be determined by the Council; and upon such other occasions as may be considered desirable.

Article VIII.—Officers

The officers of the Association shall be a President, a Vice-President for each Province, a General Secretary, a Treasurer, and a Council.

Article IX.—The Council

The Council shall consist of:

(*a*) Fifteen members elected from the general membership of the Association at the Annual meeting;
(*b*) Delegates elected by the Provincial Branch Associations;
(*c*) Representatives from affiliated Federal Bodies;
(*d*) Two members elected by the Council;
(*e*) The President, Vice-President, Secretary and Treasurer shall be members *ex-officio*.

Article X.—Committees

The Committees shall be (*a*) Standing; (*b*) Temporary, and (*c*) Special.

The Standing Committees shall be:

1. An Executive Committee;
2. A Committee on Federal Legislation;
3. A Committee on Medical Education;
4. A Committee on Necrology;
5. A Committee on Amendments to the Constitution and By-laws.
6. A Committee on Inter-Provincial Relations.

The Temporary Committee shall be the Committee of Arrangements.

Article XI.—Funds

Funds for the purposes of the Association shall be raised by an annual fee from each Ordinary and Associate Member, from the Association's publications and in any other manner approved by the Council.

Article XII.—The Association Year

The Association year shall be the calendar year.

Article XIII.—Amendments

The Constitution may be amended provided such proposed amendment, in writing, is placed in the hands of the General Secretary at least three months before the Annual Meeting and is by him inserted with the preliminary programme of the Annual Meeting in the Association Journal, and provided also it receives the endorsement of the Council.

No such amendment shall become effective until sanctioned by the Association in general session by a two-thirds vote of those present and voting.

BY-LAWS

Chapter I.—Membership

Sec. 1. Any physician residing in Canada may be elected an *Ordinary Member* of the Canadian Medical Association provided that:

(*a*) He makes written application to the General Secretary;

(*b*) He is a member in good standing in his Provincial Association; except that where no such Association is organized, he may be elected a member after being nominated by two members of the Association in good standing, and

(*c*) He pays the annual fee and subscribes to the Constitution and By-laws of the Association.

Sec. 2. *Associate Members* may be elected from amongst regularly qualified medical practitioners and other scientific men in good standing residing outside of Canada.

Associate Members so elected may enjoy all privileges of the Annual Meetings but shall have no voting power.

Sec. 3. *Honorary Members*, after nomination by a member of the Association, shall be elected by the Council and approved of by the Association in general session.

Sec. 4. So long as a member conforms to the Constitution and By-laws, he shall retain his membership and have all the privileges and powers thereof, provided that any member whose annual fee shall not have been paid on or before the 31st of December of the current Association year, shall, without prejudice to his liability to the Association, be suspended from all privileges of membership. Any member whose name has been removed from his Provincial Medical Association for unprofessional conduct, shall, upon representation from such Association, have his name removed from this Association.

Sec. 5. No member shall, except in case of his death, or expulsion, or of his ceasing to be a member under the previous provisions of this article, cease to be a member without having given notice in writing, to the General Secretary of the Association not less than one month before his next annual fee is due, of

his intention in that behalf, and having paid all arrears of fees due by him.

SEC. 6. Any delinquent member having once failed to comply with the sections of this article shall not be restored to membership until all such dues, as may be determined by the Council, have been paid, and satisfactory evidence produced that he retains his membership in an affiliated society or association, if admitted through such channel.

SEC. 7. No member shall take part in the proceedings of the Association, nor in the proceedings of any of the sections thereof until he has properly registered his name and paid his annual dues for that and previous years.

CHAPTER II.—GUESTS AND VISITORS

SEC. 1. Medical practitioners and other men of science in good standing residing outside of Canada, may attend the Annual Meeting as guests by invitation of the President or the Council, or at the discretion of either upon a letter of introduction from an absent member of the Association. They may, after proper introduction, be allowed to participate in the discussions of a purely scientific nature.

SEC. 2. Lay members of affiliated associations or societies may, upon invitation by the President, attend the Annual Meetings and participate in the discussions of a purely scientific nature.

SEC. 3. Medical students may be admitted as visitors to either the general meetings or to the meetings of any of the sections thereof, but shall not be allowed to take part in any of the proceedings. They shall be vouched for by a member of the Association to either the President or the General Secretary.

CHAPTER III.—ANNUAL MEETINGS

SEC. 1. The place of meeting shall be decided upon by the Council, and shall be announced as early as possible. The details of the meeting shall be in the hands of the Committee of Arrangements under the direction of the General Secretary of the Association.

SEC. 2. The meetings shall consist of general sessions and scientific sections.

SEC. 3. The President shall preside at all general meetings. In his absence, or upon his request, one of the Vice-Presidents shall preside.

SEC. 4. The order of business for the first general session shall be:

(*a*) Calling the meeting to order by the President.
(*b*) Addresses of welcome and response.
(*c*) Reading of minutes of last session.
(*d*) Reception of reports.
(*e*) Election of Association members to the Council.
(*f*) General business.

SEC. 5. The Rules of Order which govern the proceedings of the House of Commons of Canada shall be the guide for conducting all meetings of the Association.

CHAPTER IV.—MEETINGS OF SECTIONS

SEC. 1. The sections to be held at any Annual Meeting shall be determined by the Council. In default of their so doing, this duty shall be discharged by the Committee of Arrangements.

SEC. 2. Each section shall hold its meeting at such time and place as the Committee of Arrangements shall decide.

SEC. 3. A Chairman for each section shall be appointed by the Committee of Arrangements.

SEC. 4. The Chairman shall preside at all meetings of the section, and with the aid of the Secretary, shall arrange for the papers and other business of the section.

SEC. 5. The Secretary shall keep a correct account of the transactions and record them in a special minute-book provided by the General Secretary. The Chairman must verify and sign the minutes which must be returned to the General Secretary at the close of the meeting.

CHAPTER V.—ELECTION OF OFFICERS

SEC. 1. Any five members of the Association may hand to the General Secretary, in writing, the name of a member whom they may wish to nominate for any office.

SEC. 2. The President, after nomination by the Council, shall be elected by the Association in general session. Other officers of the Association shall be appointed by the Council. The offices of General Secretary and Treasurer may be combined.

SEC. 3. The President-Elect shall assume the duties of his office at the close of the last general session of the Annual Meeting at which he is elected.

Chapter VI.—Duties of Officers

Sec. 1. *The President* shall preside at the general sessions of the Association and at meetings of the Council, and shall perform such duties as custom and parliamentary usage require. He shall deliver the Presidential Address. He shall be a member *ex-officio* of all committees. For the Annual Meeting over which he is to preside, the President shall appoint the Committee of Arrangements consisting of five or more members who shall reside in the place at which such meeting is to held. He shall also name the chairman of this committee, who shall be responsible for the performance of its duties.

Sec. 2. *The Vice-Presidents* shall assist the President in the performance of his duties. The Vice-President of the Province in which the meeting is held shall be the First Vice-President of the Association.

Sec. 3. *The General Secretary* shall be also the Secretary of the Council of the Association. He shall give due notice of the time and place of all annual and special meetings, by publishing the same in the official journal of the Association, or, if necessary, by notice to each member. He shall keep the minutes of the General Sessions of the Annual Meetings of the Association, and the minutes of each meeting of the Council, in separate books, and shall provide minute books for the secretaries of the different sections, which he shall see are properly attested by both chairmen and secretaries thereof. He shall notify the officers and members of committees of their appointment and of their duties in connection therewith. He shall conduct all correspondence of the Association and shall publish the official programme of each annual meeting. He shall preserve and index the archives, the public transactions, essays, papers, and addresses of the Association, and shall perform such other duties as may be required of him by the President or the Council. All his legitimate travelling expenses to and from the Annual and Special Meetings and other places shall be paid for him out of the funds of the Association, and he shall receive for his services a salary to be determined by the Council.

Sec. 4. *The Local Secretaries* shall assist the General Secretary at the Annual and Special Meetings, and shall perform the duties of Corresponding Secretaries for the respective provinces they are elected to represent; these duties shall be performed under the direction of the General Secretary.

SEC. 5. *The Treasurer* shall receive and collect the annual fees, and demands of the Association, from the members. He shall be the custodian of all moneys, securities and deeds belonging to the Association, and shall only pay out moneys on an order drawn by the General Secretary and approved by the Executive Committee whose chairman shall also sign all such orders. The Treasurer shall give to the Council a suitable bond for the faithful discharge of his duties, and shall receive for his services a salary to be determined by the Council.

CHAPTER VII.—THE COUNCIL

SEC. 1. Each Branch Association shall be entitled to elect, in addition to its President, who becomes a member *ex-officio*, one delegate to serve on the Council for its membership in the Canadian Medical Association of from fifteen to fifty; two delegates for its membership from fifty-one to one hundred and fifty; three delegates for its membership from one hundred and fifty-one to three hundred; and thereafter one delegate for every three hundred of a membership above three hundred.

SEC. 2. Each affiliated Federal Body shall be entitled to elect one delegate.

No delegate shall represent more than one Branch or affiliated Association or Society.

SEC. 3. Of the fifteen members elected by the Association at large and who shall be chosen as far as possible to represent the various provinces, five shall retire at the end of each year. These shall be replaced by election at the first general session of each Annual Meeting after due nomination and ballot.

Of the fifteen members so elected, the five who shall retire at the end of the first year and the five who shall retire at the end of the second year shall be chosen by lot.

No one who has already been elected a delegate by a Branch Association or an affiliated Society shall be at that meeting elected a member of the Council under the provisions of this Section.

SEC. 4. The first meeting of the Council shall be held on the day previous to the opening of the Annual Meeting of the Association; while the Association is in session the Council shall meet daily. During the interval between the Annual Meetings the Council shall meet at the call of the President. For all specified meetings, due notice shall be sent to each member stating the objects of the meeting. All new business must first be submitted

to the Council before being taken up in the general sessions of the Association.

SEC. 5. The Council shall have charge of all properties and of all financial affairs of the Association. It shall, through its officers, conduct all the business and correspondence, and shall be responsible to the Association for the proper performance of its duties. It shall keep a record of the transactions of all its meetings and of the receipt and expenditure of all funds, and shall report upon the same to the Association at its first general session, which report shall be published in the Journal after the Annual Meeting. In the case of a vacancy in any office, on account of death or otherwise, during the interval between the Annual Meetings of the Association, it shall have the power to elect successors. Before the close of each Annual Meeting it shall nominate a President, select a place for the next Annual Meeting, and present a list of all standing and special committees and the members thereof.

SEC. 6. In order that the business of the Association may be facilitated during the interval between its Annual Meetings, the Council shall appoint a committee of seven, from among its members, which shall be known as the Executive Committee. In all the business affairs of the Association it shall represent the Council and to it, under the direction of the President, shall be delegated all the rights and powers of the Council. The President shall be a member of the committee *ex-officio* and shall select its chairman. The General Secretary shall be Secretary. The Executive Committee shall report to the Council at the Annual Meeting and at such other times as the President may request. The President, or five members of the Council, may call a special meeting at any time at which the Executive Committee may be annulled or changed.

The Executive Committee may, if necessary, refer important questions, by mail, to the Council or to the Association.

CHAPTER VIII.—COMMITTEES

SEC. 1. *The Executive Committee.*

In addition to the duties assigned in Section 6, Chapter VII, this Committee shall have charge of the publication of the official Journal of the Association, and of all published proceedings, transactions, memoirs, addresses, essays, papers, programmes, etc., of the Association. It shall have power to omit, in part or in whole, any paper or address that may be referred to it for publication in

the official Journal of the Association, by the general meeting, the Council or by any of the sections. It shall appoint an editor and a managing editor of the official Journal, who may be one and the same person if by them deemed advisable, and shall define the respective duties and responsibilities of each. It shall also appoint such assistants as may be deemed necessary for the proper conduct of the official Journal, and shall determine their salaries and the terms and conditions of their employment. The Executive Committee shall have the accounts of the Treasurer audited annually or oftener if desirable, and shall make an annual report on the same to the Council. The Executive Committee may meet when and where they may determine, and the chairman shall call a meeting on the request in writing of any three members.

Three members of the Committee shall constitute a quorum for the transaction of the business.

SEC. 2. To the *Committee on Legislation* shall be referred all matters pertaining to Provincial and Federal Medical Acts. It shall report on all legislation relating to medical affairs in the various governments, and upon all like matters proposed by medical councils.

SEC. 3. To the *Committee on Medical Education* shall be referred all matters pertaining to medical colleges and medical education. It shall report upon the condition of medical education throughout Canada and upon any proposed change, and suggest methods for the improvement of medical education.

SEC. 4. To the *Committee on Necrology* shall be assigned the duty of collecting, as far as possible, the obituaries of members dying since the last annual meeting.

SEC. 5. To the *Committee on Amendments to the Constitution and By-laws* shall be referred all matters relating to the subject, before action thereon by the Council.

SEC. 6. The *Committee of Arrangements* shall arrange for the transportation of members to the Annual Meeting and for their accommodation at the meetings. It shall provide halls for all the meetings; arrange all details and facilities for the proper conduct of the meetings; and, under the direction of the President and General Secretary, arrange for all addresses and for the business of the General Sessions of the Association.

SEC. 7. *Special Committees* may, from time to time, be appointed by the Council or by the Association in general session. They shall select their own chairman and shall perform the duties for which they are called into existence.

SEC. 8. Each committee shall send a report in writing to the Secretary of the Council at least one month prior to the Annual Meeting of the Association.

No Committee shall expend any moneys nor incur any indebtedness without the sanction of the Council.

CHAPTER IX.—ELECTIONS

All elections shall be by ballot, after nomination, and a majority of the votes cast shall be necessary to elect a candidate. Should there be more than two nominees for any position, the one having the lowest number of votes shall be dropped and a new ballot proceeded with. This procedure shall be continued until one of the nominees receives a majority of all votes cast, when he shall be declared elected.

All resolutions shall be carried by an open vote unless a ballot is requested.

CHAPTER X.—ADDRESSES AND PAPERS

SEC. 1. All addresses delivered at an Annual Meeting shall immediately become the property of the Association, to be published or not, in whole or in part, as deemed advisable, in the Journal of the Association.

Any other arrangements for their publication must have the consent of the author or of the reader of the same and of the Executive Committee.

SEC. 2. All papers, essays, photographs, diagrams, etc., presented in any section, shall become the property of the Association, to be published in the official Journal of the Association or not, as determined by the Executive Committee, and they shall not be otherwise published except with the consent of the author and of the Executive Committee.

SEC. 3. Each author of a paper read before any section shall, as soon as it has been read, hand it with any accompanying diagrams, photographs, etc., to the Secretary of the section before which it has been presented, who shall endorse thereon the fact that it has been read in that section, and shall then hand it to the General Secretary.

Chapter XI.—Amendments

At any meeting of the Association in general session, the Council may be requested to make any addition or amendment to the By-laws as may appear to be desirable. Such addition or amendment, if adopted by the Council, shall not become effective until considered and passed by the Association.

Any alteration in the By-laws originating in the Council, and adopted by that body, shall not become effective until sanctioned by the Association in general session.

All proposed changes in the By-laws shall be in the hands of the General Secretary at least one month before the Annual Meeting, and shall be published in the Journal of the Association.

Medical Societies

CANADIAN NATIONAL COMMITTEE FOR MENTAL HYGIENE

THE second annual meeting of the Canadian National Committee for Mental Hygiene was held in Vancouver, B.C., June 22nd, 1920. Dr. Charles F. Martin, president, taking the chair, and Dr. C. M. Hincks acting as secretary. The minutes of the last annual meeting, held in Toronto, May 29th, 1920, were read and adopted. The following were appointed to act as nominating committee: Dr. C. K. Russel, Dr. C. E. Foherty, Principal W. H. Vance and Dr. C. K. Clarke.

President's Address:

Dr. Martin expressed the pleasure of the Committee in holding the annual meeting in Vancouver, because British Columbia had been notably progressive in adopting an enlightened mental hygiene programme. In a few words, he outlined the valuable work that had been accomplished by the Committee in the past year. This work had consisted in educating the public concerning the problem of mental abnormality. The survey of British Columbia had resulted in many notable improvements in that province, which placed it in the lead in some particulars in regard to the care of mental deficients. Dr. Martin laid great stress on the importance of educating the medical student in psychiatry, and said that McGill University would soon have the advantages of a psychopathic hospital in this connection.

Financial Report:

The report of Fred Page Higgins & Co., Chartered Accountants, showed that financially the committee was in good standing.

Report of Nominating Committee:

The Nominating Committee brought in the following report which was endorsed by the meeting:

Officers for the Ensuing Year:

Patron: His Excellency the Duke of Devonshire, Governor-General of Canada.

Patroness: Her Excellency the Duchess of Devonshire.

President: Dr. Charles F. Martin.

Vice-Presidents: Sir Arthur Currie, Sir Robert Falconer, Sir Lomer Gouin, Sir Vincent Meredith, Sir William Price and Lord Shaughnessy.

Treasurer: Sir George Burn.

Associate Treasurer: Mr. George H. Ross.

Executive Committee: Dr. C. K. Russel, Chairman; Dr. E. A. Bott, Professor J. A. Dale, Dr. A. H. Desloges, Dr. C. E. Doherty, Dr. J. Halpenny, Dr. C. J. O. Hastings, Dr. W. H. Hattie, Mr. Vincent Massey, Pres. W. C. Murray, Dr. J. D. Pagé, Dr. C. A. Porteous, Professor D. G. Revell, Honourable Dr. W. F. Roberts, Dr. E. W. Ryan, Professor Peter Sandiford, Dr. W. D. Tait and Reverend W. H. Vance.

Financial Committee: Mr. D. A. Dunlop, Chairman; Sir George Burn, Mr. J. B. Holden and Mr. George H. Ross.

Sub-Committee on Educational and Industrial Psychology: Mrs. D. A. Dunlop, Lady Eaton, Miss Helen Reid, Mrs. W. D. Warren, Dr. E. A. Bott, Professor J. D. Dale and Reverend W. H. Vance.

Executive Officers: Dr. C. K. Clarke, Medical Director; Dr. Gordon S. Mundie, Associate Medical Director; and Dr. C. M. Hincks, Associate Medical Director and Secretary.

The following members were added to the Committee: Sir Arthur Currie, Montreal; Dr. Malcolm T. MacEachern, Vancouver; Drs. J. W. MacNeill and A. D. Campbell, Battleford, Sask.; Judge H. S. Mott, Dr. George Anderson, Mr. P. C. Larkin, Toronto, and Dr. C. B. Farrar, Ottawa.

Report of the Medical Director:

Dr. C. K. Clarke, Medical Director, in his report covering the year 1919, showed how a great deal of pioneer work had been done. He said that a great deal of necessary spade work had to be undertaken before we could have a full knowledge of the situation facing us in Canada. As a matter of policy, it had been thought advisable to direct much attention to educating the public to the immense number of mental defectives in the schools. As an illustration of the work which could be done in this regard, he spoke

of the work which had been done in Guelph, Ont., where, as the result of a survey made by the Committee, the Board of Directors in that city had adopted a programme, which was perhaps the most modern method, in Canada, of dealing with mental defectives.

He stated that New Brunswick and Nova Scotia had asked for a mental hygiene survey of their provinces, and also spoke of how, indirectly, the Committee was exercising an influence in the provinces of Quebec and Ontario.

Dr. Clarke also pointed out how the Committee had been of great assistance to the Department of Immigration, Ottawa.

Report of the Associate Medical Director, Montreal:

Dr. Mundie, in his report, told of the work that had been accomplished by the Psychiatric Clinic, Royal Victoria Hospital, where five hundred and ten patients had been examined in the first year. This clinic had been of great assistance to all the social workers in the city of Montreal. He also reported on the survey of the children in the Protestant Public Schools—over 10,000 children having been already examined.

Through the co-operation of Dr. Desloges, considerable progress had been made in improving the condition of the patients in the different asylums, and it was hoped that in a very short time all these institutions would be greatly improved, and also that an institution for the Epileptic and Feeble-minded would be established by the Provincial Government.

A course in Neuro-Psychiatry, in connection with the Social Service Department of McGill University, had been arranged for next year.

The Montreal Industrial School for Epileptics had been founded, and a start had been made by organizing two classes, where epileptic children are taught vocational training.

The social service work, in connection with the Verdun and St. Jean de Dieu Asylums, Montreal, had been in operation for over a year, with the result that the number of days of patients on parole had been increased by 11,000 days in one year.

Report of the Secretary:

Dr. C. M. Hincks, in his report, referred in a more detailed manner to the reports of the Medical and Associate Medical Directors. He gave an account of the work which Dr. A. E. Bott is doing in connection with industrial psychology. This investiga-

tion deals with retardation in schools and in industry, and an attempt was being made to find out what relation there was between these two conditions. As a result of Dr. Bott's report on the work he was doing, a special committee, known as "The Educational and Industrial Psychology Section" was appointed.

He spoke of the co-operation of the Committee with the Red Cross Society, and told about the educational publicity, which the Committee had inaugurated throughout Canada.

In Toronto, a full-time Psychiatrist, who also would fill the position of Chief Probation Officer, had been appointed to the Juvenile Court, and it was hoped that in a very short time Toronto would have its own Psychopathic Hospital.

THE ASSOCIATION OF THE SIXTH ONTARIO DISTRICT

THE annual meeting of the Association of the sixth Ontario District, comprising the counties of Victoria, Peterboro, Durham, Northumberland, Prince Edward and Hastings, was held in Cobourg on September 15th, under the presidency of Dr. T. S. Farncomb, representative of this district in the Ontario Medical Council.

There were sixty-six members present. The papers were all interesting, and of a high average. In the evening, Dr. N. A. Powell, Toronto, gave an illustrated lecture on Fractures (Colles' and Potts') which was greatly enjoyed.

Dr. J. Heurner Mullin, of Hamilton, and Dr. T. C. Routley, Toronto, president and secretary, respectively, of the Ontario Medical Association urged a thorough organization of the various units comprising the provincial association. It was pointed out, that though there are three thousand four hundred and sixty practitioners in the province, considerably less than half of the number are members of the Ontario association.

WESTERN ONTARIO ACADEMY OF MEDICINE

A JOINT meeting of the Western Ontario Academy of Medicine and divisional meeting of the Ontario Medical Association was held in the Majestic Theatre, London, on Friday, September 30th, at which between two and three hundred members of the profession were present.

Professor B. P. Watson of Toronto University gave a paper on "The Common Obstetrical Injuries, Causation, Prevention and

Treatment." Dr. Watson stated that the usual cause of the more severe lacerations of the cervix was the use of the forceps before the cervix was fully dilated, a practice which he strongly deprecated. If the first stage of labour is unduly prolonged he advised the use of morphine or morphine and hyoscine, one dose of one-sixth grain only of the former being given. He spoke also of the necessity of keeping the anterior lip of the cervix out of the way during pains in cases where it is caught between the pubic bone and the advancing head. Laceration of the perineum and its repair, prolapse of the uterus, cystocele and ectocele were also discussed by the speaker.

Dr. Frank A. Kelly, of Detroit, showed motion pictures of intestinal surgery, demonstrating his technique, and also his method of treating inguinal hernia using a local anæsthetic.

The use of motion pictures as shown by Dr. Kelly ought to be of great value in teaching students the technique of surgery, and copies of the films kept in medical libraries would make splendid works of reference for busy practitioners who wished to brush up hurriedly on the technique of special operations.

Dr. T. C. Routley, Secretary of the Ontario Medical Association, briefly addressed the meeting on the necessity for more complete organization among the medical men of the Province if they are to make their influence felt regarding quackery, irregular practitioners, standardization of drugs, etc.

In the evening an informal dinner was given in the Tecumseh House, to which ladies also were invited.

Dr. Mullin of Hamilton, President of the Ontario Medical Association, gave an address on the aims and objects of the Ontario Medical Association. Other speakers were, Peter McArthur, of Ekfrid; Dr. H. A. MacCallum, of London, and the Dean of the Arts Department of Western University. Dr. George McNeill, President of the Academy, presided at both gatherings.

A clinic is to be given under the auspices of the Western Ontario Academy of Medicine on October 20th, and others have been arranged for throughout the winter.

Books Received

THE following books have been received and the courtesy of the publishers in sending them is duly acknowledged. Reviews will be made from time to time of books selected from those which have been received.

DISEASES OF CHILDREN. Presented in Two Hundred Cases. Histories of Actual Patients selected to illustrate the Diagnosis, Prognosis and Treatment of the Diseases of Infancy and Childhood, with an Introductory Section on the Normal Development and Physical Examination of Infants and Children. By JOHN LOVETT MORSE, A.M., M.D., professor of pædiatrics, Harvard Medical School. Third edition, 639 pages with illustrations. Price, $7.50. Publishers: W. M. Leonard, 711 Boylston Street, Boston, 1920.

PUBLIC HEALTH AND INSURANCE: American Addresses. By SIR ARTHUR NEWSHOLME, K.C.B., M.D., F.R.C.P., lecturer on Public Health Administration at the School of Hygiene and Public Health, Johns Hopkins University, Baltimore. 269 pages. Price, $2.50. Published by: The Johns Hopkins Press, Baltimore, 1920.

HUMAN PARASITOLOGY. With Notes on Bacteriology, Mycology, Laboratory Diagnosis, Hæmatology and Serology. By DAMASO RIVAS, B.S. Bio., M.S., M.D., Ph.D., assistant professor of parasitology, University of Pennsylvania. 715 pages, illustrated. Price, $8.00 net. Publishers: W. B. Saunders Co., Philadelphia, London, 1920.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles on TREATMENT, MEDICINE, SURGERY, etc. By Leading Members of the Medical Profession throughout the world. Edited by H. R. M. LANDIS, M.D., Philadelphia, and others. Volume II. Thirteenth Series, 1920. Publishers: J. B. Lippincott Co., Philadelphia, London, and 201 Unity Building, Montreal.

VACCINATION IN THE TROPICS. By W. G. KING, C.I.E., late sanitary commissioner with the Government of Madras. Price, 5/ net. Published by: Tropical Diseases Bureau, 23 Endsleigh Gardens, London, N.W. 1, 1920.

GEORGE MILLER STERNBERG. A Biography. By his wife, MARTHA L. STERNBERG. Price, $5.00. 232 pages with illustrations. Published by American Medical Association, 535 N. Dearborn Street, Chicago, 1920.

LECTURES ON SURGERY TO NURSES. By ALLAN H. TODD, B.Sc., M.S., F.R.C.S., orthopædic registrar, Guy's Hospital. 270 pages. Price, 7/6 net. Publishers: Edward Arnold, 41 Maddox St., London, W., 1920.

NORMAL HISTOLOGY WITH SPECIAL REFERENCE TO THE STRUCTURE OF THE HUMAN BODY. By GEORGE A. PIERSON, M.D., Sc.D., professor of anatomy in the University of Pennsylvania. 418 pages, with 438 illustrations, 88 of which are in colour. Twelfth edition. Publishers: J. B. Lippincott Co., Philadelphia and London, 201 Unity Building, Montreal, 1920.

VENEREAL DISEASE. ITS PREVENTION, SYMPTOMS AND TREATMENT. By HUGH WANSEY BAYLY, M.C., Pathologist to the London Lock Hospitals. 152 pages, with 54 illustrations. Price, 10/6 net. Publishers: J. & A. Churchill, 7 Great Marlborough Street, London, 1920.

Lippincott's Nursing Manuals. CARE AND FEEDING OF INFANTS AND CHILDREN. A Text-Book for Trained Nurses. By WALTER REEVE RAMSEY, M.D., associate professor of diseases of children, University of Minnesota. Including Suggestions on Nursing by MARGARET B. LETTICE, supervising nurse of the Baby Welfare Association. Second edition revised. 290 pages, with 123 illustrations. Price, $2.50. Publishers: J. B. Lippincott Co., Philadelphia, London and 201 Unity Building, Montreal, 1920.

STUDIES ON EPIDEMIC INFLUENZA. Comprising Clinical and Laboratory Investigations by Members of the Faculty of the School of Medicine, University of Pittsburgh, 1919.

THE DUODENAL TUBE AND ITS POSSIBILITIES. By MAX EINHORN, M.D., professor of medicine at the New York Post-Graduate Medical School. Octavo of 122 pages with 51 illustrations. Cloth, $2.50 net. Philadelphia and London. W. B. Saunders Company, 1920.

AN EPITOME OF HYDROTHERAPY. For Physicians, Architects and Nurses. By SIMON BARUCH, M.D., LL.D., consulting physician to Knikerbocker and Montefiori Hospitals. 205 pages, with illustrations. Price, $2.00. Publishers: W. B. Saunders Company, Philadelphia and London, 1920.

THE CATARRHAL AND SUPPURATIVE DISEASES OF THE ACCESSORY SINUSES OF THE NOSE. By ROSS HALL SKILLERN, M.D., professor of laryngology Medico-Chirurgical College, Post-Graduate School, University of Pennsylvania. Third edition, thoroughly revised and enlarged. 418 pages, with 300 illustrations. Price, $6.50. Publishers: J. B. Lippincott Co., Philadelphia, London and 201 Unity Building, Montreal, 1920.

ADVANCED LESSONS IN PRACTICAL PHYSIOLOGY. For Students of Medicine. By RUSSELL BURTON-OPITZ, S.M., M.D., Ph.D., associate professor of physiology, Columbia University, New York City. 238 pages, with 123 illustrations. Price, $4.00 net. Publishers: W. B. Saunders Company, 1920. Canadian Agents: The J. F. Hartz Co., Toronto.

Book Reviews

EXTRA PHARMACOPEIA OF MARTINDALE AND WESTCOTT. Revised by W. HARRISON MARTINDALE, Ph.D., Ph.Ch., F.C.S. and W. WYNN WESTCOTT, M.B., D.P.H. Seventeenth edition. Vol. I. Price, 27/- net. Publishers: H. K. Lewis & Co., Ltd., 136 Gower Street, London, W.C. 1, 1920.

We have much pleasure in calling attention to this new edition of Martindale and Westcott's Extra Pharmacopeia, a most useful prècis of information regarding drugs both old and new, invaluable for the practitioner and pharmacist. It is issued, as it has been for the last few editions, in two volumes. The first is

now on sale and contains all up-to-date information regarding the new antiseptics, the new arsenical and antimonial preparations, and new coal tar derivatives, and the antiseptic value of the newer dyes; also information on the use of colloidal metals in therapy, on the hypertonic saline, on gum acacia solutions for intravenous solutions, and on recent additions to our knowledge of the use and value of vaccines, serums, and organotherapy. The first volume in its previous editions has proved in the past to be one of the most frequently consulted volumes on the writer's desk. This last edition promises to be of equal value. The second volume in course of publication deals with methods of assay and the testing of drugs and chemicals with a review of recent bacteriology, and while of special value to the chemist and pharmacist many of its pages will convey useful and practical information to the enquiring physician. The additions to our knowledge in pharmacology and therapeutics during the past four years amply warrant the appearance of this new edition and we strongly commend it to our readers and especially emphasize the value of the first volume to every physician.

A. D. B.

VACCINATION IN THE TROPICS. By W. G. KING, C.I.E., late sanitary commissioner with the Government of Madras. Price, 5/ net. Published by: Tropical Diseases Bureau, 23 Endsleigh Gardens, London, N.W. 1, 1920.

This is a practical book. Every sentence in it is eloquent of actual experience. As its title indicates, it is especially concerned with vaccination and with the management and manufacture of vaccine in the tropics. Nevertheless, there is much in it that is directly applicable to other climates. The first section, consisting of 22 pages, is a general discussion of vaccination. It is admirable; its substance should be a part of the knowledge of every physician.

J. L. T.

MANUAL OF PSYCHIATRY. Edited by AARON J. ROSANOFF, M.D., clinical director, King's Park State Hospital, New York. Fifth edition, revised and enlarged. Publishers: John Wiley & Sons, New York, 1920.

This fifth edition of a well-known and important work shows definitely the trend of modern psychiatry, slow though it may be. The insertion of such chapters as the one of psychiatry in relation to sociology, and one of psycho-analysis, shows that Rosanoff

recognizes the importance of such subjects in the teaching of psychiatry. The chapter on psycho-analysis is largely in the form of well selected quotations from Freud and a few of his followers. Rosanoff has evidently not been won over altogether to the teaching of Freud, which is probably to his credit, but it is an evidence of the appreciation of an advancing viewpoint. The chapter on psychiatric social work is perhaps too brief, and more detail with regard to this section might have been given with advantage. The extensive and elaborated classification still shows that much work has yet to be done before we can have a concise and clear understanding of mental diseases. The chapters on epilepsy and cerebro-spinal syphilis, to mention only two examples, have been rewritten, and a short account is given of the relation of mental diseases to internal medicine through the endocrine system.

G. S. M.

WAR AGAINST TROPICAL DISEASE. Being Seven Sanitary Sermons addressed to all Interested in Tropical Hygiene and Administration. By ANDREW BALFOUR, C.B., C.M.G., M.D., B.Sc., F.R.C.P., D.P.H., director-in-chief, Wellcome Bureau of Scientific Research. 219 pages, illustrated. Publishers: Ballière, Tindal & Cox, London, 1920.

This absorbing volume is discursive in matter and style, and, for that reason, is the more interesting. It has an excellence of letter-press and a profusion of illustration characteristic of all the author's publications. Though several of the sermons were delivered to medical audiences, clearness of expression aud frequent humour, make them pleasant and valuable reading for laymen.

The book should be read by everyone who feels an interest in the measures by which the health of human beings is preserved. It is a timely volume in that it deals especially with the health of tropical countries. It is natural that it should do so since the author's experience of sanitation and medical research in the Tropics is unique. He, as much as any man, appreciates the dependence of our European civilization upon the Tropics. He understands how rapidly that dependence is increasing and how inevitable is a migration from our temperate climates to areas where warmer skies give larger and more easily gained crops twice, or more often, in every year.

Especially interesting to Canadians are pages describing the medical organization proposed for Egypt; there, as in Canada, a Ministry of Health has been newly established.

J. L. T.

HAND BOOK OF DISEASES OF THE RECTUM. By LOUIS J. HIRSCHMAN, M.D., F.A.C.S., Vice-chairman, section on gastro-enterology and proctology, A.M.A. Third edition. 378 pages with 223 illustrations and 4 coloured plates. Price, $5.00. Publishers: C. V. Mosby Company, St. Louis, 1920.

This book is now in its third edition, having been first published in 1913. It can be heartily recommended as a valuable work for the student and the general practitioner, while the general surgeon will also find in it a great deal of value. It is written in a very practical way, yet with obvious knowledge, and with adequate presentation of the scientific side of the subject. There are short chapters on the anatomy of the hæmorrhoidal region, on the physiology of defecation, and on the microscopical and clinical examination of stools, while the pathology of the various conditions discussed is given briefly. Certain aspects of the subject upon which the author lays great stress seem particularly commendable to the reviewer, such as, for instance, his insistence on the necessity of a thorough proctoscopic examination in all cases in which the lesion is not obviously external, his condemnation of haphazard prescription writing, and his oft-reiterated advice to rest content with nothing less than a complete diagnosis. An admirable feature of the work lies in the very precise discussions of technique and the abundance of good illustrations. In this specialty, the practical work of which can so often be done in the office as opposed to the hospital, and can also be done in large part by the general practitioner, Dr. Hirschman's book will be found of great assistance and a reliable guide.

One or two points of detail may be selected for comment. The author's advocacy of local anæsthesia in the majority of lesions situated within two or three inches of the anus is to be commended. In this proctologists generally are following and elaborating the methods which Schleich, in Berlin, was the first to teach and practise over twenty years ago. There is no doubt, for instance, that many patients suffering from hæmorrhoids can be thoroughly relieved by the ambulatory treatment, with successive small operations in the doctor's office. In the treatment of hæmorrhoids the author condemns the clamp and cautery and also the Whitehead operation, and advocates the ligature with clean dissection. In the treatment of *pruritus ani* he commends rightly the operation of Ball, if lesser methods have failed. In constipation due to an atonic sigmoid and rectum he advises direct stimulation of the bowel musculature by mechanical dilatation with rubber bags, and

has devised a special apparatus for the purpose. He describes a number of other original procedures in treatment, among which may be mentioned particularly his operation of valvotomy for chronic fibrosis of Houston's valves, by the use of a rubber ligature. Particular mention should be made of a short but most excellent chapter on dysentery, by Jelks, of Memphis, which forms a valuable addition to the work. Altogether the book is strongly to be recommended.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles on TREATMENT, MEDICINE, SURGERY, etc. By Leading Members of the Medical Profession throughout the world. Edited by H. R. M. LANDIS, M.D., Philadelphia and others. Volume II. Thirteenth series, 1920. Publishers: J. B. Lippincott Co., Philadelphia, London and 201 Unity Building, Montreal.

In the present number of this long established series of clinics begins a new section on Industrial Medicine. The editors are two surgeons who have large industrial practices in the Middle West. Their object is to present a series of illustrative cases of injury and illness which arise chiefly in the course of an individual's daily work, and to deal with these cases from the point of view of more accurate diagnosis, treatment and prognosis. In connection with the prognosis, the length of disability and the ultimate degree of disability will be covered thoroughly and occasional reference will be made to the legal aspects of the cases, and the workings of the various Employer's Liability Acts.

In the present volume fourteen such cases are described in a most interesting manner, the descriptions are clear, and the illustrations are numerous and to the point. Each report is followed by a discussion of the more important points and a criticism of the methods of treatment employed. These clinics will be of special value to those engaged in the practice of industrial surgery, and should be appreciated also by those whose general practice brings them into contact with the accidents of everyday life.

D. S. L.